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ON THE EQUIVALENCE OF DROPS.

BY S. L. TALBOT, PH.G.

(*From an Inaugural Essay.*)

The design of the writer in experimenting upon this subject was to determine, if possible, some relation between the size of the drop and a minim of the same liquid, and thus enable any one to determine the number of drops of any given liquid that should be directed, to secure a uniform dose of said liquid.

The labor involved in this endeavor can be judged of when about 275 different liquids were experimented with and each one tested three times. The results, as summarized, show the general exactness which characterized the work of our former fellow-member, Mr. E. Durand, whose labors have been carefully reviewed by the author, and demonstrate most fully that minims only should be directed in prescribing quantities of liquids less than half a fluidrachm.

The whole experiments made show results according with Durand's and Bernouilli's statements, that the bulk of drops depends upon the density of the liquid, the cohesion of the constituent particles of it, and also upon adhesion, as shown by the variation when dropped from vessels of different material or shape. They also agree, for the most part, with the two general rules of Durand: "First. *That liquids with* SMALL PROPORTION *of water afford a* SMALL DROP, *and* vice versa. Second. That amongst liquids containing a large proportion of water, *those not charged with remedial substances give a larger and heavier drop than these same liquids having extraneous bodies in solution.*" In his second rule the word "HEAVIER" should be erased, as in the officinal solutions, in most cases, the bodies in solution cause increase in weight, which more than offsets or counterbalances the decrease in size; and the same statement is true of tinctures made with diluted alcohol. In nearly all cases the cohesion seems to be impaired by the interposition of bodies in solution, and cohesion would seem to exert a stronger

influence than anything else upon the bulk of drops; though, if this be true, the statement of Evan L. Gmelin, in his "Handbook," that "the cohesion of liquids is pretty nearly in proportion to their specific gravity," cannot be accepted; since alcohol (specific gravity ·835) and mercury (13·5) afford nearly the same number of drops to the fluid-drachm, and chloroform (specific gravity 1·480) yields a drop of less than one-fourth the size of a drop of water.

Summary of Results.

To sum up the results of these experiments, as briefly as possible, it may be stated that the administration of powerful medicines by drops is always dangerous. A single fluid may, under differing circumstances, give drops varying greatly in size and weight.

Much diversity is found in the size of drops from different bottles, and a single bottle is inconstant in this respect. The most constant, and therefore the best bottles for dropping are those with ground necks and glass stoppers, and wide, thin, even lips. If bottle of this kind are used, each one should be carefully tested, and marked with the size of its drops as compared with a minim.

To drop from corks applied to the outer edge of lips of bottles is even less accurate than using the bottles alone. Much better results than either may be gained by the use of droppers; and of those tested, all of which are in more or less common use, the best is the Barnes dropper. Yet it will be seen that this does not accomplish all that is claimed for it, only two out of a dozen yielding "sixty drops distilled water to a fluidrachm," which is the claim for superiority set forth on each box cover.

Cohesion exerts the greatest influence upon the bulk of drops. Temperature has little effect, and rapidity of dropping, almost none.

The list of officinal liquids shows that the largest drop was yielded by syrup of gum arabic (44 to f3), and the smallest by chloroform (250 to f3). Of bromine the number of drops corresponds with chloroform, but it cannot be accepted as correct, on account of the extreme volatility of the liquid, which, notwithstanding caution, and as great haste as was compatible with successful counting, caused the loss of a large percentage.

Strict general rules cannot be laid down as to the corresponding size of drops of classes of preparations, though the volatile oils, tinctures, spirits, oleo-resins and fluid extracts may be grouped together, as yield

ing drops usually less than one-half the size of drops of water. Solutions, syrups and dilute acids afford drops but slightly smaller than water, excepting solution of nitrate of mercury and syrups containing or made from fluid extracts. Acids, wines, fixed oils, vinegars and mixtures give, in most cases, drops of more than one-half the size of water, about two-thirds.

In the drop measurement of the various classes of preparations in the United States Pharmacopœia there was found a noticeable uniformity; amongst the officinal wines the extremes showed a difference of but fourteen drops in the fluidrachm. The fluid extracts and tinctures, much larger classes, show, naturally, a greater range, but withal a regularity sufficient to suggest the addition of a list giving the average size of drops of each class. But four exceptions were found necessary; these are appended to the tabular list. It will be observed that the liquids yielding smallest drop are placed first in order in the following table:

Average Size of Drops of Classes of U. S. P. Preparations.

Class.	Average No. of drops in f3i.	Class.	Average No of drops ni f3i.
Ether and stronger,	174	Mixtures,	89
Fluid extracts,	141	Vinegars,	77
Spirits,	141	Syrups not containing fluid extracts,	69
Tinctures,	136	Solutions (1 exception),	66
Volatile oils,	131	Diluted acids,	61
Oleo-resins,	124	*Exceptions.*	
Acids (3 exceptions),	123	Solution nitrate of mercury,	131
Wines,	106	Nitromuriatic acid,	76
Fixed oils,	103	Muriatic acid,	70
Syrups containing fluid extracts,	97	Sulphurous acid,	59

A CORRECTION.

In my article in the JOURNAL for April, on "Tests for Arsenic," I expressed the opinion that the subnitrate of bismuth might have contained arsenic. This is a mistake, and I hasten to correct it, as the chemist, Prof. Howard, testified in court that he had examined a sample of it and it contained none. As my attention was called to it by the professor, I now recollect that such was his testimony in court, and in justice to him I make the correction, as I have the highest confidence in his ability and thoroughness as an analytical chemist.

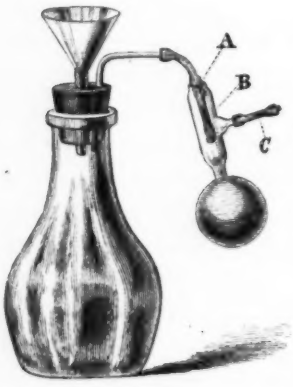
PHIL. HOGLAN.

Newcomerstown, O., May 24th, 1880.

A SIMPLE DEVICE FOR FILTRATION.

By D. Anson Partridge.

The cut represents a simple but efficient arrangement for filtration under atmospheric pressure.



A B C is a glass tube three inches in length, and about three-eighths of an inch internal diameter.

At *A* the tube is drawn tapering, to make it fit closely to a rubber tube three-sixteenths of an inch calibre, which passes inside of the glass tube. A short piece of glass tube is inserted into the rubber tube at *A* to make a tight joint; the lower end of this rubber tube is closed by inserting a short piece of glass rod. At *B* a smooth slit is made in the rubber tube three-eighths of an inch long (as recommended by Bunsen) to act as a valve.

On the projecting short limb of the glass tube is a piece of rubber tube, one-eighth of an inch calibre and about one inch long; the outer end of this tube is closed by a piece of glass rod. At *C* a slit is made in the tube to serve as a valve.

The lower end of the glass tube is drawn out to adapt it to a rubber ball of about two inches diameter.

This little apparatus, when adapted to a pint flask, will, with a few compressions of the ball, afford a pressure equivalent to a column of water 8 to 10 feet high.

VOLUMETRIC ANALYSIS OF LIQUIDS AND SOLIDS.

By Alfred B. Taylor.

Analysis is the separation of a compound into its several parts.

Qualitive[1] analysis is the determination of the parts, without reference to quantities, while quantitive analysis determines also the quantities of the parts, thus showing their relative proportions.

[1] "Qualitive" and "quantitive" (from "qualis" and "quantum") would seem to be much better words than "qualitative" and "quantitative" (from "qualitas" and "quantitas"). Ti-ta-tive is about as barbarous as "te-to-tum."

Quantitive analysis by weight, or gravimetric analysis, consists in separating and accurately weighing the constituents of a compound.

The necessary operations are frequently very complicated, occupying a long time, and in many cases require elaborate apparatus, as also the exercise of much care and experimental knowledge.

Volumetric analysis, or quantitive analysis by measure, on the other hand, is quickly performed, as a general rule is susceptible of extreme accuracy, and needs much simpler apparatus. The leading principle of the method consists in submitting the substances to be estimated to certain characteristic reactions, employing for such reactions solutions of known strength, and from the volume of solution required for the production of such reaction, determining the weight of the substance to be estimated, by aid of the known laws of chemical equivalence.

Suppose, for example, that it is desirable to know the quantity of pure silver contained in a "Bland dollar." The coin is first dissolved in pure nitric acid, by which means a bluish solution, containing silver, copper, and probably other metals, is obtained. It is known that chlorine combines with silver, forming a chloride of silver, which is insoluble in dilute nitric acid. The proportions in which the combination takes place are the atomic weights of the two substances, or 35·5 parts of chlorine to every 108 parts of silver; consequently, if a solution of pure chloride of sodium be prepared by dissolving in water such a weight of the salt as will be equivalent to 35·5 grains of chlorine = 58·5 grains of chloride of sodium (its molecular weight), and the solution be diluted to the measure of 1,000 grains of distilled water, every single grain-measure (or one-thousandth part) of this solution, upon being carefully added to the silver solution, will combine with 0·108 grain of pure silver to form chloride of silver, which, being insoluble, will be precipitated. In the process of adding the salt solution to the silver, drop by drop, a point is at least reached when the precipitate ceases to form, thus showing that all the silver has been separated from the solution. Upon carefully examining the graduated vessel from which the salt solution has been used, it at once becomes apparent how many grain-measures of liquid have been necessary to produce complete decomposition; and to obtain the answer to the problem is a simple matter of calculation.

For instance, suppose the quantity used to completely decompose the one-tenth part of the solution of silver was 343 grain-measures; this number multiplied by 0·108 (the amount of silver thrown down by

each grain-measure of the salt solution) will give the exact number of grains of pure silver contained in one-tenth of a dollar = 37·+ grains, or 371·25 grains of pure silver in the dollar.

The metric system of weights and measures is now used exclusively (for scientific purposes) in France, Prussia, Austria, Holland, Sweden, Denmark, Belgium and Spain, the unit of weight being the gram (= 15·43235 grains troy); a gram of distilled water at 4°C.[1] (39°F.) measures exactly a cubic centimeter or a "fluigram;"[2] the kilogram contains 1,000 grams; the liter contains 1,000 fluigrams.

The following apparatus is required in the preparation and use of the necessary solutions:

1. A glass flask, which, when filled to a mark on the neck, contains one liter.

2. A graduated cylindrical jar, which, when filled to 0, contains one liter, and is divided into one hundred equal parts.

3. A burette, a graduated tube which, when filled to 0, holds one hundred fluigrams, and is divided into one hundred equal parts.

When volumetric analysis first came into use the test solutions were generally prepared so that each substance to be tested had its own special reagent, and the strength of the standard solution was so calculated as to give the result in percentages; consequently, in alkalimetry, a distinct standard acid was used for soda, another for potash, a third for ammonia, and so on, necessitating a great variety of standard solutions.

Griffin and Ure appear to have been the first to suggest the use of standard test solutions based on the atomic system.

Normal test solutions, as a general rule, are prepared so that one liter at 16°C. shall contain the hydrogen equivalent of the active reagent weighed in grams (H = 1).

Decinormal solutions are made one-tenth, and centinormal solutions one-hundredth, of this strength.

In the case of univalent substances, such as silver, iodine, hydrochloric acid, sodium, etc., the equivalent and the atomic (or in the case of salts, molecular) weights are identical; thus a normal solution of

[1] It is customary to make the measurements with metrical apparatus at 16°C. (about 60°F.)

[2] This name was suggested by the author in a paper published in the "Medical and Surgical Reporter," Feb. 24, 1877, p. 171.

hydrochloric acid must contain 36·5 grams of the acid in a liter of fluid, and a normal solution of sodic hydrate, 40 grams.

In the case of bivalent substances, such as lead, calcium, oxalic acid, sulphurous acid, etc., the equivalent is one-half of the atomic (or in the case of salts, molecular) weight; thus a normal solution of oxalic acid would contain $\frac{126}{2}$ or 63 grams of the acid in a liter of fluid.

Further, in the case of trivalent substances, such as phosphoric acid, a normal solution of sodic phosphate would be made by dissolving $\frac{358}{3}$ = 119·3 grams of the salt in distilled water, and diluting the liquid to the measure of one liter.

The following standard test solutions have been recommended to be introduced into the United States Pharmacopœia, the same being now official in the British Pharmacopœia:

1. *Volumetric Solution of Bichromate of Potassium.*

$(K_2Cr_2O_7 = 295)$.

This is a decinormal solution, and contains 4·917 grams of the salt in one liter of the liquid.

The reaction which takes place between potassic bichromate and ferrous oxide is as follows:

$$6FeO + K_2Cr_2O_7 = 3Fe_2O_3 + Cr_2O_3 + K_2O.$$

It is therefore necessary that one-sixth of an equivalent in grams should be used in a liter for the normal solution, and one-sixtieth for the decinormal; and as it is preferable on many accounts to use a dilute solution, the latter is the more convenient for general purposes.

2. *Volumetric Solution of Hyposulphite of Sodium.*

$Na_2S_2O_3, 5H_2O = 248$.

The normal solution contains 248 grams in the liter; the decinormal solution is usually more convenient, and contains one-tenth as much, or 24·8 grams in the liter, while in some cases the centinormal solution is desirable. This can readily be prepared by diluting 100 fluigrams of the decinormal solution to one liter.

3. *Volumetric Solution of Iodine.* I = 127.

The solution directed in the Pharmacopœia is the decinormal solution, which contains 12·7 grams of iodine in the liter.

4. *Volumetric Solution of Nitrate of Silver.*

$Ag.NO_3 = 170$.

This solution is also the decinormal solution, and contains 17 grams of nitrate of silver (corresponding to 10·8 grams of pure silver) in one liter of liquid.

5. *Volumetric Solution of Oxalic Acid.*

$H_2C_2O_4, 2H_2O = 126.$

Oxalic acid being bivalent, the normal solution is made by dissolving $\frac{126}{2} = 63$ grams of the acid in a sufficient quantity of water to make the solution measure one liter.

6. *Volumetric Solution of Soda.*

$NaHO = 40.$

This is a normal solution, and contains 40 grams of sodic hydrate in one liter of liquid.

Might not the process of volumetric analysis be much simplified, and especially in view of the abandonment of measures of capacity by the U. S. Pharmacopœia, would it not be more in accordance with the plan of the work, if measures of capacity were abandoned here also? True, the process would no longer be volumetric, but the leading principle upon which the system is based would still remain.

It is proposed, then, that all test solutions should be made gravimetric instead of volumetric; that is to say, repeating, for example, the process of testing the amount of silver in a Bland dollar, the standard solution of chloride of sodium would be prepared by dissolving 58·5 grains of chloride of sodium in distilled water, and diluting the solution until it weighed 1,000 grains, instead of measuring 1,000 grain-measures, as before. In this case every grain (weight) of this solution, upon being added to the silver solution, will combine with 0·108 grain of pure silver, and no further observation is necessary than to note how many grains of the salt solution have been used. This plan would do away with all apparatus; the only instruments necessary to carry it out would be flasks or appropriate vessels in which to weigh the solutions, and an accurate set of scales and weights to weigh them.

Variations in temperature would not affect the results, and inasmuch as weighing can be done with more exactness than measuring, greater accuracy would be obtained.

This plan would be equally satisfactory with any system of weights, whether the British system or the metric system, or simply parts by weight were used.

This same principle applied to all the test solutions would, in my opinion, render the operation more easy of execution, retaining all the advantages and discarding some disadvantages of the present system.

The principal facts herewith presented have been derived from "The Systematic Handbook of Volumetric Analysis," by Francis Sutton, F. C. S., published London, 1876, to which the reader is referred for further information on the subject.

SOME REMARKS ON SYRUPUS GUAIACI.

By T. C. Craig, Ph.G., M.D.

In the "American Journal of Pharmacy" for 1876, March No., page 139, the following formula appears:

Syrupus Guaiaci.

℞	Pulveris guaiaci, ...	℈xxxii
	Liquoris potassæ, ...	f ℥ss
	Sacchari albi, ...	℔i (avoird.)
	Aquæ, ...	f ℥viii

Fiat syrupus. Signa—Dose, a teaspoonful, containing 5 grains of guaiacum.

Having had occasion to make syrup of guaiac quite a number of times, and using this formula, I was surprised at finding very much of a residue left after making the syrup. As each teaspoonful of the syrup was to contain five grains of guaiacum, I thought it strange that so much of it should remain insoluble; hence I was led to investigate the subject and discover the fallacy if any existed.

I noticed that if I added a solution of caustic potash to the residue and filtered it the filtrate was dark brown, almost black. From this I concluded that the amount of solution of caustic potash prescribed in the formula was insufficient to extract the active principles of the guaiacum, and that the reason I had so much residue was that more caustic potash was needed; but how much? This I determined in the following way: According to recent authority (National Dispensatory) guaiac resin contains, as its active principles, guaiaconic acid and guaiaretic acid, the former to the amount of seventy per cent.; the latter, ten per cent.

The chemical formula for guaiaconic acid is $C_{38}H_{40}O_{10}$, and for guaiaretic acid is $C_{20}H_{26}O_4$. The combining weight of guaiaconic acid is 656 and that of guaiaretic acid is 330. The combining weight of caustic potash (KHO) is 56.

Now, to neutralize 656 atoms, molecules or grains of guaiaconic acid will require 56 parts of caustic potash; again, to neutralize 330 atoms, molecules or grains of guaiaretic acid will require 56 parts of caustic potash; then 656, the guaiaconic acid, plus 330 of guaiaretic acid will require 112 parts of caustic potash to neutralize them.

Guaiac resin consists, as before stated, of 70 per cent. guaiaconic acid and 10 per cent. guaiaretic acid—80 per cent. in all, or 80 grains in every hundred grains of the resin. According to our formula eight-tenths of all the guaiac resin should be dissolved, *i.e.*, eighty grains out

of every hundred grains of the resin. Every five grains of guaiac resin contains four grains of guaiaconic and guaiaretic acids; then five hundred and twelve grains will be the amount of the two acids present.

Now, 986 : 112 : : 512 : 58, or nearly four times the amount called for in the formula. Acting on the accuracy of this calculation, we made syrupus guaiaci, using 58 grains of KHO instead of the one-half fluidounce of liquor potassæ called for, and the result was a small amount of residue, a much darker syrup and, therapeutically and pharmaceutically, a better preparation. Allow me, then, in conclusion, to suggest the following formula for syrup of guaiac:

℞	Pulveris guaiaci resinæ, ...	ℨxxxii
	Potassic hydrate, ...	lviii grs.
	Sacchari albi	lbi (avoird.)
	Aquæ, ...	q. s.

Dissolve the KHO in 8 fluidounces of water; moisten the guaiac with this solution; pack it in a percolator and gradually pour on the balance of the solution; when this ceases dropping add sufficient water to make the percolate measure eight fluidounces; add the sugar and dissolve.

A STUDY OF THE STRUCTURE OF DYE-WOODS.

By Dr. F. R. von Hohnel,

Lecturer in the Polytechnic Institute of Vienna.

Translated from "Dingler's Polytech. Jour.," by Prof. Sam'l P. Sadtler.

Having for some time been engaged upon a thorough histological and histo-chemical investigation of dye-woods, I recognized the necessity of establishing, aided by accurate macroscopic examination, some reliable means of distinguishing the various dye-woods from each other and from woods similar to them. The researches of Wiesner[1] and Vogel[2] afford all that can be desired as regards the completeness of our knowledge of these woods. It appeared, however, that one important point remained untouched, viz., reliable macroscopic recognition. The examination of dye-woods with the naked eye, or aided by the lens, as well as sufficient consideration of differential characters, appear to have passed unnoticed.

[1] Wiesner: "Die Rohstoffe des Pflanzenreiches," p. 552.

[2] Vogel: "Untersuchungen ueber den Bau," etc., in "Lotos," March, 1873.

To any one possessing a microscope and micrometer, with some skill in the use of the same, aided also by the publications referred to, the task of distinguishing the different varieties of dye-woods is easy; but to a person having only a lens difficulties present themselves, the removal of which, as far as possible, is the object of this communication. I would return thanks to the gentlemen mentioned above for the material placed at my service. It was, in every respect, all that was required, and also affords sufficient guarantee for the general validity of the characteristics described below.[1]

Having but a splinter of the wood, it is easy, with the help of a a cross section, that can be got without trouble, to form accurate radial and tangential sections, as well as to produce cleavage planes, which would furnish all the cardinal points necessary for the carrying out of the following examination.

A preliminary examination of the cross section with the glass will show that dye-woods, and woods most nearly related to them, can be arranged in a number of groups, which, as regards their structure, are sharply defined and separated from each other, but within these groups reliable distinction is attended with great difficulty. The groups are: 1. Blue-wood. 2. The inferior varieties of Red-wood from America; Lima, Costa Rica, Santa Martha red-wood and others. 3. Brazil-wood, Sapan-wood and Coulteria Red-wood. 4. Red Sandal-wood

[1] For present information I will remark that the entire wood portion of the dye-woods, as regarded for present purposes, consists of parenchyma, wood fibre, medullary rays and ducts. The rays appear on the cross section, often to the naked eye, but always under a lens of 4 to 5 magnifying power, as delicate, pale, parallel lines, which are usually embedded in a darker, solid background, consisting of wood-fibre. The direction of the medullary rays is the radial. A section in this line is called the radial section. Perpendicular to the radial line (tangential) show on the cross section other fine and somewhat wavy lines, which represent the limits of the annual rays. The longitudinal section, perpendicular to the radial section, is called the tangential section. It intersects all the medullary rays obliquely, while the radial section lays them bare throughout its length. The wood fibres and ducts appear on the cross section as cut perpendicularly. The first form, to a certain extent, the background of the wood. They determine the hardness of the wood body, and in the cross section appear as dark, hard, closed masses of tissue, in which the masses of pale parenchyma are embedded as patches of round or obliquely stretched shape, or as adherent, narrow tangential bands or lines. In the masses of parenchyma, mostly characterized by peculiar arrangement, are the ducts and hollow tubes disposed lengthwise on the wood.

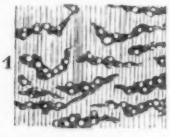
(African and Indian). 5. Cam-wood. 6. Maclura Yellow-wood. 7. Barberry-wood. 8. Rhus Cotinus Yellow-wood (Fustic).

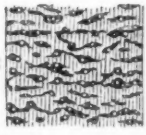
All these groups can be distinguished from each other without the use of the microscope. The blue-wood (Campeachy), however, is not always easily distinguished from some of the inferior varieties of red-wood by studying its structure by the aid of the lens. I give below accurately described characteristics of the several groups, with particular reference to distinguishing properties of the individual woods. The accompanying figures are sections as seen with a lens.

1. *Blue-wood.*—The medullary rays are partly visible to the naked eye. There is also a dark brown background, approaching black in color, in which lie faint red lines, points and streaks. The cross sections of the ducts are not generally noticeable as such. In other cases (varieties in Domingo blue-wood) the pale parenchymous tissue predominates, and eventually forms the base in which the wood tissue (fibre) is lodged, in the form of small patches. In such cases the ducts are always somewhat wider and plainly visible as hollow tubes (to 0 25 mm. width).

Upon the tangential and radial sections the ducts can yet be plainly recognized as half tubes. (With Brazil-wood this is not the case.) The medullary rays are not visible on the tangential section. They appear radially as cross bands of very different widths, and clear and brilliant. The broadest medullary rays vary from 2 to 3 mm. in width; between them are visible delicate cross lines, corresponding to the small rays and never so regularly arranged as in Brazil-wood.

The lens discloses on the cross section a tissue arrangement as seen in Figs. 1 and 2. The clear but dull parenchyma is (as in all the figures) dark, and the medullary rays appear perpendicular. They never, as a rule, form exactly straight lines, and are characteristically of different thickness. When the parenchyma predominates, there the rays as well as ducts are more frequent and wider, and the latter are disposed in radial series.





The medullary rays very rarely occur tangentially, and under the lens nothing further of any importance is shown by either a tangential or radial view.

2. The inferior varieties of *Red-wood* from America are in structure intimately connected with the *Blue-wood*. Their color, however, distinguishes them, more or less readily, from the latter. In relation to structure and remaining properties, the Lima Red-wood (Cæsalpina crista?), Nicaragua Red-wood (C. brasiliensis) and others are not represented with accuracy.

Without the lens neither medullary rays nor annual growths are discernible on a cross section. The ducts are not at all, or only partially, visible. The arrangement of the parenchyma (Fig. 3) is the same as in the Campeachy-wood, only the structure is finer. The parenchymous spots appear more combined, and drawn out more delicately at their ends.

In the tangential section the ducts appear as dark lines, and the medullary rays are very short and delicate longitudinal lines, which are not (as with Brazil-wood) disposed in horizontal series. On a radial section are seen the medullary rays, 0·3 mm. wide. These, with reference to their width, may be classed as between the Brazil- and Sapan-wood. Under the lens, the cross section gives us Fig. 3. We notice here the duct openings, 0·14 to 0·1 mm. in width, and the very irregularly developed medullary rays, while true annual rings are not to be seen. The tangential sections show, especially in the poorer, lighter-colored species, the medullary rays very distinctly, as dark longitudinal strokes, which are irregularly divided, so that a wave appearance (Brazil- and Sandal-wood) is not produced. This is not even noticed in the radial section. The medullary rays occur mostly as short, broad cross bands, the ducts as shining, dark half tubes.

3. The Brazil, Sapan and Coulteria Red-wood agree with each other in the essential peculiarities of their structure. They all, for example, possess almost equally distributed duct pores, and round and very characteristic parenchymous spots.

Of all the red-woods, the *Coulteria* Red-wood (Coulteria tinctoria) has the finest structure. Its cross section presents almost exactly the same appearance as the Brazil-wood, only the annual rings are more distinct and the wood is colored more of a brown than a red. The tangential and radial sections are about the same as in the Brazil-wood.

The *Brazil-wood* presents in its cross-section a reddish-brown, hard, shining background, in which are noticed innumerable scattered pale red points. Many of these are indistinct and blurred. Without a

lens the medullary rays and annual rings are not discernible. The ducts on the tangential section appear as delicate, dark, longitudinal lines. Tangential cleavage planes exhibit very delicate cross-lines, which impart a wave-like appearance to the same. They originate from the medullary rays disposed in horizontal lines. The principal radial cross-section has a similar appearance. The medullary rays are all small, 4 to 5=1 mm. Fig. 4 represents a cross-section under the lens. The medullary rays are equally removed from each other, and almost equally strong. The annual growths are recognized as very delicate cross-lines. The parenchymous spots are rounded and not sharply defined. They contain several very narrow ducts which, however, on a cross-section and under a lens, are found to be distinct tubes. The parenchymous spots rarely adhere to each other; they never form tangential separated fascia.

A tangent view with the lens shows the medullary rays as delicate, short, dark, longitudinal lines, the ducts as dark, half-tubes, and the parenchyma as pale, longitudinal stripes. Upon both longitudinal views under the lens the wave appearance becomes more evident.

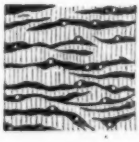
Sapan-wood (Fig. 5) exhibits on a cross-section larger parenchymous spots than the Brazil-wood. The duct cross-sections appear as holes to the naked eye. The annual rings are distinct. Characteristic paler and darker concentric fascia are formed by the parenchymous spots being in greater proximity on the internal edge of the annual growths. The medullary rays are just visible to the naked eye. The radial view does not disclose a wave appearance, although the medullary rays are more distinct than in the case of Brazil-wood (0·25 to 0·66 mm. high). The wave appearance is not observed on the tangent cross-plane. The medullary rays appear very distinctly as short longitudinal stripes, especially on cleavage surfaces. On both longitudinal surfaces the ducts appear as recognizable half-tubes. The lens shows the large duct sections very plainly, also the medullary rays, separated from each other by nearly equal spaces, and the narrow annual rings looking like lines. The parenchymous sheath of the ducts are relatively smaller than in the Brazil and Coulteria Redwood, often barely visible, so that the respective ducts appear to border closely on libriform. Nothing new is observed when viewed longitudinally under the lens.

4. *Red Sandal-wood* (Pterocarpus santalinus), in cross-sections, pre-

sents a dark red base, in which innumerable compact or more loosely-arranged cross-bands of dull, almost brick-red color, are lodged. At some places these bands appear swollen into knots, and in each swelling is found, on the rule, a duct of almost 0·3 mm. diameter, which is at once discerned by the naked eye to be a tube. The remarkably fine medullary rays are only visible with the lens, and are represented by figure 6. They are almost exactly of equal distance from each other, and somewhat curved about the larger ducts.


4


5


6

To the naked eye the tangent section appears covered with very delicate, slightly wavy cross-lines, which (as seen under the microscope) as with Brazil-wood, where they are less striking and finer, are produced by the regular disposition of the medullary rays; 5 cross-lines are equal to 1 mm. The ducts on the longitudinal sections appear mostly as somewhat bent, dark-brown and shining half-tubes. The radial section shows the small, almost equally high medullary rays, which form a wave. There is slight indication of longitudinal lines, resulting from the concentric parenchymous layer of wood fibre. The ducts are visible to the naked eye, complete and strongly lustrous. Frequently they occur on the radial cleavage planes as unaltered tubes. Under the lens the cross-sections of the medullary rays on the tangent planes are defined in the form of fine, almost black stripes, about 0·2 mm. in length. On the radial longitudinal section the medullary rays appear covered with very fine and innumerable cross-lines. The lens shows, too, the sections of the ducts, which are somewhat longer than broad, and very distinct.

The African sandal-wood cannot be distinguished macroscopically or microscopically from the Asiatic with any certainty. According to Vogel ("Lotos," 1873), it is probably a little brighter colored, and the ducts are somewhat larger.

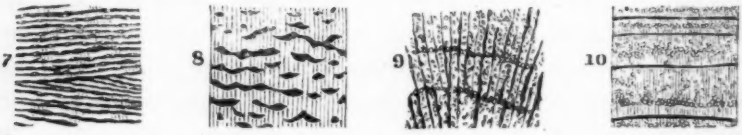
5. *Cam-wood* (from Baphnia nitida) is very curiously constructed. The cross-section (Fig. 7) shows neither ducts nor medullary rays to the naked eye, but delicate, frail, wavy parallel or slightly divergent parenchymous zones. Under the lens the ducts appear as minute

points (finer than those of the Brazil-wood) of 0·08 mm. diameter. The medullary rays occur in scattered patches as remarkably delicate lines. The body of the wood-fibre is hard and black-red; the parenchymous bands are unbroken and cherry-red.

The tangential incision plane does not disclose any remarkable peculiarity in structure, even under the lens. Here and there are single widened ducts. Very characteristic are the longitudinal stripes on the radial incision plane; they are visible without the lens. They originate in the parenchymous zones; 4 to 6 of them equal 1 mm. The medullary rays appear as bright small bands of unequal width. Under the lens, a slight cross marking is observed on them. The ducts appear in spots as dark and shining longitudinal lines.

6. Old *Fustic* (Maclura tinctoria).—The cross sections show medullary rays without use of lens. The annual rings fail completely. This forms the most material difference between it and the Maclura aurantiaca. In the thick dirty-brown background, partly isolated, partly more or less removed, are besprinkled band-like compact parenchymous patches. (See Fig. 8.) The bands appear to be indented. The ducts are completely filled with parenchyma, and therefore the duct openings are not visible under a microscope.

The tangent section shows, in a brilliant background, innumerable regularly scattered, dark, short streaks (medullary rays), and tolerably broad, somewhat bent, ochre-yellow lines, which originate in the ducts filled with parenchyma. On the radial section the medullary rays appear as pale cross lines, about 0·2 to 0·25 mm. in width. Under the lens, they reveal 6 to 20 delicate lines, originating from the separate cell series. On the longitudinal section the ducts, under the lens, appear as if filled with yellow-colored scales, which are lustrous.



The wood of the Maclura aurantiaca is readily distinguished from that of old *Fustic* by the well-defined annual ring, also by the light and not ochre-yellow color of the parenchymous mass, and its much finer structure. The parenchymous patches are more oblique in position, and in the spring consist of ducts filled with parenchyma, etc.

7. *Barberry* (Roots of the Berberis vulgaris).—Intense lemon-yel-

low color. The naked eye will detect on the cross section a regular yellow background, in which are imbedded strongly converging, very broad, light yellow medullary rays. All of the latter are distinct. The ducts appear as small dark points, which are partly regularly distributed over the cross section, partly disposed in cross bands. Under the lens, the ducts are found to be empty, and nothing more is noticeable except what the eye would detect. The width of medullary rays on the cross section sometimes increases, and sometimes the opposite occurs. The annual rings are visible, but not so distinct as in the other yellow-woods. On the tangent section the medullary rays occur as nearly obliterated, broad longitudinal lines, the ducts as very thin dark lines. On the radial section the medullary rays appear over 2 mm. wide, and are furnished with horizontal lines.

8. *Rhus Cotinus.*—In a cross section the naked eye will perceive concentric light and dark cross bands. The ducts appear as small points, and the medullary rays are only indicated. On the tangent section the ducts are noticed, in an ochre-yellow ground, as light brown longitudinal lines. On the radial section the very small medullary rays occur rarely; the ducts appear as on the tangent section. Fig. 10 represents the cross section, under the lens. The fine medullary rays are only partially visible. The very narrow ducts are disposed in radial series and the entire wood fibre split up into brown, compact, ductless zones, and into yellow, porous, concentric layers, full of ducts. On the longitudinal sections the ducts appear complete and very lustrous, while the medullary rays are rare on the radial section. They are darker than the base, just as in the tangent section, where they appear as very minute, pale brown longitudinal lines.

From what has been said I believe I have made it evident that to crude organic products belong a number of properties which are visible to the naked eye and under the lens, but which have heretofore been too slightly appreciated in considering these articles. As the search for accurately distinguishing features between raw products, similar but of unequal value, is one of the principal ends in view in the study of such material, no method should be despised in order to arrive at the desired end. I hope the preceding communication will be received in this sense.

LONDON PURPLE.

By C. V. Riley.

From the "American Entomologist," Bulletin No. 3 of the U. S. Entomological Commission.

This powder is obtained in the following manner in the manufacture of anilin dyes. Crude coal oil is distilled to produce benzol. This is mixed with nitric acid and forms nitro-benzol. Iron filings are then used to produce nascent hydrogen with the excess of nitric acid in the benzol. When distilled, anilin results: to this arsenic acid, to give an atom of oxygen which produces rose anilin, and quicklime are added to absorb the arsenic. The residuum which is obtained by filtration or settling is what has been denominated "London Purple," the sediment being dried, powdered and finely bolted. The powder is, therefore, composed of lime and arsenious acid, with about 25 per cent. of carbonaceous matter which surrounds every atom. Experiments which I made with it in 1878 impressed me favorably with this powder as an insecticide, and its use on the Colorado potato beetle by Professors Budd and Bessey, of the Iowa Agricultural College, proved highly satisfactory. I was, therefore, quite anxious to test its effect on the cotton worm in the field on a large scale, and in the winter of 1878–79 induced the manufacturers to send a large quantity for this purpose to the Department of Agriculture. The analysis[1] made of it by Prof. Collier, the chemist of the Department, showed it to contain:

	Per cent.
Rose anilin,	12·46
Arsenic acid,	43·65
Lime,	21·82
Insoluble residue,	14·57
Iron oxide,	1·16
Water,	2·27
Loss,	4·07
	100·00

Through the liberality of the manufacturers, Messrs. Hemingway & Co., a number of barrels of this powder were placed at my disposal the past season and distributed to various observers and agents in Georgia, Alabama and Texas. Early in the spring Mr. A. R. Whitney, of Franklin Grove, Illinois, found it to be a perfect antidote to the canker worms which had not been prevented from ascending his apple trees, and the experiments of those whom I had intrusted to make them

[1] Ordinarily the rose anilin has mixed with it a little ulmic acid and an increase of 2 per cent. of arsenic acid.

on the cotton worm, as well as those made under my own supervision, all showed that its effects are fully equal to those of Paris green. Like the latter it kills the worms quickly and does not injure the plants, if not applied in too great a quantity. Farther, it also colors the ingredients so as to prevent their being mistaken for harmless material. Finally, its cheap price removes the temptation to adulterate the poison, as every adulteration would prove more expensive than the genuine article. It is even superior to Paris green, as, owing to its more finely-powdered condition, it can be more thoroughly mixed with other ingredients and used in smaller proportion. Experiments on a large scale have been made with the dry application at the rate of 2 lbs. to 18 lbs. of diluents, also at the rates of 1, ½, ¼ and ⅛ lb. to 18 of the diluents. The last proved only partially effectual, and in no case were the plants injured or the leaves even burned. In all but the last case the worms were effectually killed, but as the mixture, at the rate of ¼ lb., was applied with greater care and regularity than is generally had on a large scale, and also in very dry weather, the proportion of ½ lb. to 18 of the diluents is most to be recommended. All higher proportions are simply waste of the material.

Like Paris green, it is not soluble, but is much easier kept suspended in water than the former. If applied in this way some care has to be taken in stirring it in the water, as it has a tendency to form lumps, owing to its finely-powdered condition. Experiments on a large scale with this material diluted in water gave the following results: When used in the same proportion as Paris green, namely, 1 lb. of the poison to about 40 gallons of water, one experimenter reports that the leaves were slightly crisped, while four others report a perfect success and no injury whatever to the plant. Experiments by myself and Mr. Schwartz showed that when applied in the proportion mentioned and thoroughly stirred up in the water the leaves were partly crisped, though by no means so much as by arsenic, even when applied in weaker solution. When used in smaller proportion, or at the rate of ¾ or ½ lb. to 40 gallons of water, it did not burn the leaves and still proved effectual in destroying the worms. Repeated experiment on a smaller scale confirmed these results obtained on large fields, and also showed that the proportion may be still farther reduced, and when applied with great care and in very dry weather ¼ lb. to 40 gallons will kill. Still farther reduction in the proportion of the powder used gave negative results. I would, therefore, recommend the use of ½ lb. of this powder to from 50 to 55 gal-

lons of water as the proportion most likely to give general satisfaction by effectually destroying the worms without injuring the plants.

All that has been said under the head of Paris green as to the desirability of adding a small quantity of flour or other substance to give adhesiveness to the liquid will hold equally true of London purple, but the latter has in many respects a great advantage over the former, especially in its greater cheapness.

London purple has this farther advantage over other arsenical compounds hitherto employed: Its finely-pulverized condition seems to give it such penetrating power that, when used in liquid, it tints the leaves so that cotton treated with it is readily distinguished at a distance, the general effect being quite marked as compared with any of the other poisons similarly applied. It seems also to be more effectually absorbed into the substance of the leaf, and is therefore more persistent. At the same time experience shows that it does not injure the squares any more than Paris green.

JAPANESE BELLADONNA.

By E. M. Holmes, F.L.S.

Curator of the Museum of the Pharmaceutical Society.

In January last I received from Professor Flückiger, of Strassburg, a specimen of a root labeled "Japanese belladonna," and which, in his opinion, "seemed to contain atropia."

The root was totally different in character to true belladonna; but, having at that time no clue to its botanical source, I put it on one side for future investigation.

My attention was again called to this belladonna root by a sample received a few days ago from Messrs. Hearon, Squire and Francis, who informed me that it was offered at a drug sale in London early this month, but that no one bid for it.

Just at this time I had occasion to refer to a figure of *Scopolia carniolica*, Jacq.,[1] and was struck by the remarkable resemblance between the root of this plant, as figured by Jacquin, and the Japanese belladonna.

On turning to the recently published work by Franchet and Savatier on Japanese plants, I found that an allied species, *S. japonica*, Max., occurs in Japan, and that no other solanaceous plant there described

[1] Jacquin, "Obs. Bot.," p. 20.

would be likely to have a stout rhizome like that of scopolia, most of the solanaceous plants of that country being either annuals, or suffruticose perennials, like dulcamara. On referring to Maximowicicz's description of *Scopolia japonica*,[1] I found that he considered it to be the *Atropa Belladonna* of Japanese botanists. Although Franchet and Savatier record it only, on the authority of Tschonaski, from near streams on the highest mountains of Nikoo, and on that of Tanaka, from an unknown locality, yet it is well known that the Japanese cultivate several solanaceous plants, and probably this one among them, since it is figured both in the "Sô mokou Zoussetz," vol. iii, fol. 17 (under the name of *Hashiri dokoro*), and in the "Phonzou Zoufou," vol. xxi, fol. 22 (under *Ro outo*). It would seem, therefore, to be a well known plant, and may reasonably be supposed to be as hardy as the *S. carniolica* of English gardens, and the root might well be an article of commerce in Japan.

Japanese Belladonna Root.—The left hand figure represents the root, the right hand one the twisted rhizome, and the central one a transverse section of the rhizome with the vascular bundles more marked than usual.

I entertain no doubt, therefore, that the Japanese belladonna root which has lately been offered for sale in Europe is the root of *Scopolia japonica*, Max. This species differs from the European one (*S. carniolica*) chiefly in its more acute leaves, which have constantly longer petioles, in the style being curved or declinate instead of straight, and in the teeth of the calyx being sometimes very unequal. The fruit is unknown. In size the Japanese plant equals robust specimens of the European species.

The rhizome, as met with in commerce, varies in length from 2 to 4 or 5 inches, and on the average is ½ inch in diameter, cylindrical or slightly compressed, rarely branched, knotty and more or less bent and marked on the upper surface with circular, disc-like scars, where the

[1] Max., "Mel. Biol in Bull de l'Acad. Imp. des Sc. de St. Pétersbourg," vol. viii, p. 629.

leafy stems have arisen. It is the slightly alternate disposition of the nodes from which these stems arise which gives the rhizome its knotty character. No rootlets remain attached to the rhizome, but each node is surrounded with one or more indistinct rows of dots or scars, apparently indicating their presence. The rhizome is externally of a brown color, not white when abraded, as in belladonna, of a pale brown color internally, speckled with numerous very minute dots, which appear under a lens to be white and starchy, and scattered through a resinous or horny looking structure. The bark is so similar in color and so closely applied to the meditullium as not to be readily distinguishable by the naked eye. The odor is slightly mousy and narcotic, and the taste hardly any except a slight bitterness. From portions which were mixed with the rhizome, it would appear to terminate in a genuine root of some length and thickness.

The recent investigations by Ladenburg, concerning the relationship of the solanaceous alkaloids to each other, seem to point out that the active principle of this drug might be worth examination, as well as that of its European congener.

A few remarks on the genus *Scopolia* may perhaps not be out of place here. It was founded by Jacquin on the peculiarity of the fruit, which is a capsule. The capsule, with the calyx and pedicel, fall off together, and after a time the capsule dehisces transversely, like that of henbane. In color of the flower and in foliage the plant so closely resembles belladonna that were it not for the fact that belladonna has a baccate fruit and no rhizome, even a good botanist might be led to call it an *Atropa*. The genus is named after Antoine Scopoli, an Idrian physician and professor of botany, who appears to have been the first to notice the European species.

The Japanese scopolia has the leaves often more or less deeply dentate, or even repand-dentate, in which character it presents an analogy to *Solanum nigrum* in this country, the leaves of which may sometimes be found quite entire and sometimes coarsely toothed.—*Pharm. Jour. and Trans.*, April 3, 1880.

THE HISTOLOGY OF ARAROBA or GOA POWDER.[1]

By Thomas Greenish, F.C.S.

Within the last few years much interest has attached to a drug imported from Brazil, and to which the native name "Araroba" is applied, and sometimes also "Goa" powder, from Goa, a Portuguese possession of that name on the Malabar Coast, through which it was imported into British India.

Its chemistry has been investigated by Professor Attfield and subsequently by Liebermann, the botanical characters of the tree whence it is produced have been described and illustrated, and so much of its history as has reached this country can be gathered from various papers in the pharmaceutical journals of the last five years.

The object of this paper is to deal with the histology of araroba, a substance at the present time employed chiefly, if not exclusively, for the production of chrysophanic acid.

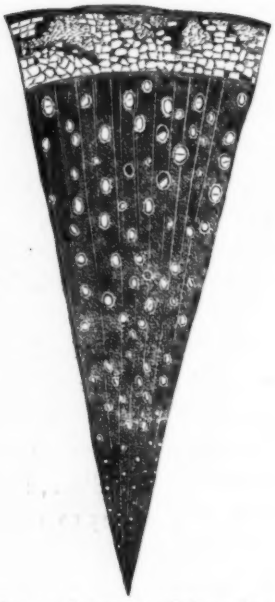
As met with in commerce araroba is in the form of a powder more or less agglomerated; mixed with it, and covered by it, are splinters of the wood in which this substance originates. The powder has an intensely bitter taste, and somewhat of a resinous adhesion to the fingers; it is said that the color is originally of a fine yellow, resembling sulphur, and that this by exposure gradually changes to a rhubarb color, and then darkens to that of aloes. Occasionally in the commercial powder lumps are met with, which, when broken, show internally a canary color, whilst the external parts are dark brown. A sample dried at 100 to 110°C. lost 1·98 per cent.

The drawing No. 1 represents a segment of a transverse section of the wood yielding araroba, from an authentic specimen deposited in the Society's Museum, and the fragments of wood found in the powder, from sections of which the other drawings were made, correspond with this in structure.

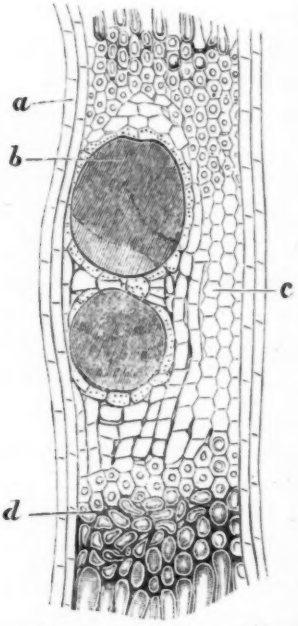
The bark externally is more or less covered with lichen, which gives it a somewhat grey and black patchy appearance. The epidermal tissue is for the most part thrown off by a suberous layer composed of a large number of cork cells compressed together and forming a layer of dense tissue; within this is a cellular tissue containing starch grains, and amongst these cells are sprinkled sclerogen or stone cells—cells much thickened by secondary deposit, and, therefore, equally with the cork cells, capable of great resistance to external or internal destruc-

[1] Read at the evening meeting of the Pharmaceutical Society, April 7, 1880.

tive influences. The granular protuberances seen in a section of the bark are due to these sclerogen cells being left intact, whilst those containing the starch grains have to some extent given way.



No. 1—Segment of Araroba.



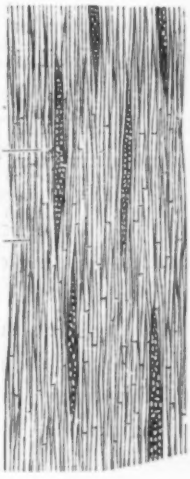
No. 2—Transverse section of Araroba, enlarged.—*a*, medullary rays; *b*, porous vessels; *c*, parenchyma of wood; *d*, libriform cells.

With reference to the bark little need be said, as it does not appear to enter into the composition of araroba. Within the bark is the woody column, traversed from the medulla to the bark by narrow medullary rays colored by the araroba, and the round spots show the porous vessels, most of them also filled with the same substance.

The drawing No. 2 shows a small part only of the woody column of this segment, enlarged as seen under the microscope, and bounded on either side by the medullary rays. The whole segment of No. 1 being only a repetition of this section, an explanation, therefore, of the cellular structure of this portion will give the cells comprising the whole. It exhibits four distinct forms of cells. There are the medullary rays, *a*, on either side; they are usually two cells wide, narrow, thin-walled and elongated in a radial direction. *b* represents porous

vessels, surrounded by the parenchyma, *c*, of the woody tissue, having some of its cells thickened and dotted, and *d* the libriform cells. This comprises the whole of the cell tissue of the wood yielding araroba.

The drawing No. 3 is a longitudinal section through the medullary and libriform cells, showing the latter disposed in their length as elongated pointed cells; the several cells composing these tissues were isolated and identified.



No. 3.

The first question that presented itself was, what tissues are involved in the formation of araroba? Under the microscope, either alone or in any fluid that does not change its nature, araroba presents the character of an amorphous powder; by heating it in a test-tube in a solution of caustic alkali, which dissolves about 80 per cent., it was hoped that some indication would be obtained, in the deposit, of cell tissues, but the result was not satisfactory. Recourse was then had to boiling in repeated portions of benzol, but with no better success. Adopting, however, the micro-chemical method, allowing the caustic alkali to run under a cover glass on the slide of moistened araroba, whilst under the microscope, and by this means dissolving away gradually the soluble portion of the powder, fragments of those cells just referred to as composing the several tissues were found and identified without difficulty.

In this manner broken portions of libriform cells and of porous vessels, also of cells of the parenchyma of the wood were discovered. Those of the medullary rays were too fragmentary to be distinguished satisfactorily; being a very delicate tissue it was scarcely expected otherwise. In no single instance were cork cells present, or any of the sclerogen cells before referred to as forming part of the bark; starch, although found in the cells of the parenchyma of the bark, has not been detected in any sample of araroba examined. It is fair to infer, therefore, that the bark does not form any portion of the araroba, although in some samples of it pieces may be found just in the same manner as pieces of the wood; also that from the fragments of the cells in the araroba, which were obtained by the process just mentioned, a conclusion may be arrived at that the whole of the cell tissue, com-

prising the woody column, from within the bark to the medulla, is involved in the decomposition, which results in the formation of araroba.

The next question that occurred was, what was the physical condition of this substance immediately resulting from the destruction of tissue? The araroba was found to have permeated more or less and imbued with color all the tissues, even those which retained their form, but it filled many of the porous vessels, as shown in No. 2, and whilst examining under a high power the deposit in one of these vessels remains of cell tissue were visible, so disposed as to convey the impression that the deposit must have once been in a fluid condition; and subsequent examination of sections from different pieces of wood, taken at random from a parcel of powder, presented other indications leading to the same conclusion.

It will be observed that the libriform cells, *d*, on one part of the section, pressing closely upon each other, are in their outline sharply polygonal, whilst at the other they are separating, and show indications of having been subjected to some solvent action; the cells have lost their polygonal outline and are gradually becoming loose and shapeless, and this is seen rather on the outside in contact with the powder than in the interior of the wood. It is difficult also to understand how the porous vessels in the interior of the wood could have been so densly filled, unless the araroba had been in a fluid or semifluid condition. That its presence in these porous vessels is not due to decomposition of the vessels themselves is evident from the fact that when the contents are removed by solution and the cell wall examined it is found to be intact. Did the araroba consist of finely comminuted cell tissue the action of caustic alkali would little affect it; but the solution of about 80 per cent. proves that the cell tissue has been changed to some other substance soluble in caustic alkali. So far as these investigations go they point to a fluid condition of araroba, whilst its presence in the clefts and hollow places of the wood, and the fact of more being found in old trees than in younger ones, must dispose at once of the idea of its being a secretion.

The most interesting point of the inquiry next suggested itself, the cause of this formation. On this point there is no satisfactory evidence; but araroba has its analogies in the gums and resins, and to the student of materia medica these obscure changes in plant organism are of especial interest. Kützing first observed structure in tragacanth,

but erred in considering it to be a fungoid growth. Mohl confirmed Kützing's observations that it possessed structure, but proved that the gum was due to a metamorphosis of the cell membrane, and the remains of cell tissue may very readily be seen under the microscope.

From the investigations of Wigand, Karsten and Wiesner, most of the natural resin which exudes from the coniferæ is due to a similar change in the starch and the cell membrane. The gums, of which gum arabic may be taken as typical, owe their origin to a similar change from an obscure cause in the interior of the tree. In one instance the medulla and medullary rays with the starch are involved and in another the bast cells of the bark.

This change has sometimes been called a degradation of cell tissue, but the word, restricted to its application in geology, is not a suitable term. If this had been a degradation, or rubbing down, of cell tissue the result would be nothing more or less than a mass of cell *debris;* but this is a disorganization or destruction of organic structure, resulting in the formation of a substance of a totally different character.

Last autumn in the forest of Thuringia resin was seen exuding from a large number of coniferæ and also gum from the cherry trees. A specimen which was brought home well illustrates a natural exudation of the cherry gum, and there seems little doubt but that the same natural law which governs the changes resulting in the formation of gums and resins governs also those which result in the formation of araroba, and that this substance was, equally with those named, originally in a fluid condition.—*Pharm. Jour. and Trans.*, April 10, 1880.

RAISINS.

The United States is the greatest raisin consuming country in the world, and uses annually more raisins than the whole of Europe. The market is mainly supplied from Spain, the raisins known as "Malagas" being considered the best. They come from a comparatively narrow strip of country in the south of Spain, which has hitherto been regarded as surpassing all other regions for raisins of that character. The annual yield of Malaga grapes averages 2,450,000 boxes of twenty pounds each. It sometimes reaches 2,500,000 boxes, and last season about 2,000,000 boxes were marketed. Of this enormous yield the United States takes fully one-half, on which it pays a duty—as on all other raisins—of two and a half cents per pound.—*Ibid.*

TESTING OILS.

Maumene found, says the "Textile Manufacturer," after experimenting with all the known methods for testing oils, the one with sulphuric acid to be the best.

This test is made as follows:—In a graduated cylinder, to hold 150 cubic centimeters, put 50 grams of oil, ascertain the temperature of the same, and add with a pipette 10 cubic centimeters sulphuric acid, stir with thermometer for a few minutes, and note the highest degree of temperature.

Pure olive oil gives an increase of 42 deg. C.

		Degrees.
50 grms.	Pineseed oil give increase of	43
" "	Tallow oil " "	41—43½
" "	Ricinus oil " "	47
" "	Horsefoot oil " "	51½
" "	Oil of bitter almonds "	52
" "	Oil of sweet " "	52½
" "	Rapeseed oil "	58
" "	Earth nut oil "	67
" "	Sesame oil "	68
" "	Hemp oil "	98
" "	Nut oil "	101
" "	Liver oil (Raja) "	102
" "	Cod (G. Morrhua) "	102
" "	Linseed oil "	103

—*Journ. App. Sci.*, Feb. 2, 1880.

THE ADULTERATION OF OLIVE OIL,

And the various substitutes for it, have increased to such an extent of late years that the French Academy of Sciences in its last sittings had under its consideration the best practical means of detecting the nefarious traffic. The celebrated chemist, Dumas, indicated some of the methods that can be employed. The chemical tests are numerous enough, but cooks, as a rule, are wanting in the necessary knowledge to enable them to apply them. A very simple method is to watch the variety of shapes taken by different oils on the surface of water poured into a saucer. If the oil is genuine olive oil, the drop will take an irregular shape, like an islet well indented and marked with bays and promontories. If it is the product of the black garden poppy, the form will be at first round, but quickly festooning into elegant half circles round the edge. The same result will ensue with rape oil, but

the formations round the edge will be more pronounced. Arachis oil gives a circular drop, accompanied by a great quantity of fine little globules, as does oil of sesamé, in which the globules are, however, still more minute. Colza oil makes a precise and well-defined circle. If there are one or more spurious oils mixed up with the true olive juice, the forms of the drops will resemble, more or less, the types above indicated, according to the greater or lesser proportion of the various adulterating substances. Oil which, when shaken in the bottle, assumes a permanent chaplet of air bubbles, is not pure olive oil, for in the latter air bubbles are only transitory. It may, therefore, be set down as a mixture in which rape oil predominates. Finally, there is an adulterant extracted from cotton seed, now largely employed by dishonest manufacturers, and which is about to engage the special attention of the Academy. This oil can be rendered colorless, and, as it possesses neither taste nor smell, affords great facility in falsifying olive oil. But it is of very little use for the Academy of Sciences or any other learned institution to expose these tricks of trade unless the laws are enforced against the adulterators.—*Jour. of Applied Science*, Jan. 1, 1880.

CHEMICAL NOTES.

By Prof. Samuel P. Sadtler, Ph.D.

Inorganic Chemistry.—*On the Formation of Sulphuretted Mineral Water.*—A French chemist, Eugene Planchud, claims to have shown that the presence of sulphur in mineral waters is due to the reducing action of living vegetable matter on the sulphates contained in these waters. On examining under the microscope the long delicate threads found clinging to the stones in the neighborhood of sulphur springs and which are generally supposed to be threads of sulphur, the author discovered them to be composed of hollow cylindrical tubes matted together. Most of these tubes were filled with spores, which when liberated moved about with a rapid motion, finally came to rest and developed hair-like processes like those from which they had been discharged.

M. Planchud conjectured these hair-weeds to be the cause and not the consequence of the sulphur in the water. To prove this he made the following experiment: He filled three flasks with a solution of sulphate of lime; into one of these he put dead organic matter; into the other two, hair-weeds obtained from a sulphur spring. One of the

two flasks containing the hair-weeds he boiled to destroy the life of the weed and its spores. All three flasks were then sealed hermetically and allowed to stand under similar conditions. On opening them it was found that only the flask containing the living hair-weeds gave off sulphuretted hydrogen. The other flasks remained unchanged during several months. At the end of six months, however, the flask into which the dead organic matter had been put was found to smell faintly of sulphuretted hydrogen and on examination hair-weeds were found in it.—*Chem. News*, May 21, p. 236.

Action of Potassium Permanganate upon Potassium Cyanide.—E. Baudrimont has found that when the solution is alkaline the result of the reaction is an abundance of nitrous fumes and relatively little urea; if some acid (sulphuric), however, is added, urea is formed in abundance and with it carbonic, nitric, formic and oxalic acids, the latter as a decomposition product of the urea. The formation of these products is illustrated by equations.—*Compt. Rend.*, 89, 1115.

Dissociation of Iodine and other Halogen Elements.—J. M. Crafts announced recently (this journal, May 1880, p. 262) that, while free chlorine showed a normal density and was not dissociated even at the highest temperatures, free iodine was dissociated and apparently gave a density two-thirds of the normal value as first stated by Prof. Victor Meyer. Crafts has repeated and extended his observations and now gives the following as a summary of his results:

Temperature.	Density	Per. cent. of Normal Density.
455°	8·70; 8·78; 8·75	1·
677°—682°	8·06; 8·58	0·94
757°—770°—765°	8·05; 8·28	0·93
831°—878°	8·04; 8·11	0.92
1039°—1059°—1030°	7·18; 7·02; 6·83	0·81
1270°—1280°	6·07; 5·57	0.66
1390°	5·23; 5·31	0·60
1468°	5·06; 5·07	0·58

He concludes from these experiments that the vapor-density of iodine compared with air, diminishes *progressively* with the increase of temperature between about 600°, when it is still normal, to about 1470°, where it is only 0·58 of the normal density, and he supposes that a still higher temperature than that which he has thus far been able to obtain would give a half normal density. If this phenomenon is attributed to a dissociation it must be interpreted to mean that the molecule I_2 is separated into two atoms I+I or else that a group which

represents a physical unity is separated into two parts, and he is not disposed to found upon these experiments any new hypotheses regarding the constitution of iodine.—*Ber. der Chem. Ges.*, xiii, p. 869.

Victor Meyer has just published a note announcing results confirming those of Crafts. He has, indeed, by the use of considerably higher temperatures than any yet applied, obtained figures lower than those of Crafts'. Thus he finds the density of iodine at the highest temperature reached to be 4·53 to 4·55 to 4·57.

The calculated density for I_2 is 8·79; for $\frac{2}{3}I_2$ is 5·83; for I_1 is 4·39. He proposes to continue the experiment in order to see if the limit is reached at 4·39, which would make the result one of simple dissociation as Crafts supposes, or if a density of 2·93 ($\frac{1}{3}I_2$) may be reached which would agree with the "chlorogen" hypothesis of the compound nature of the halogen elements.—*Ibid.*, p. 1010.

Organic Chemistry.—*On a Supposed Crystallized Chinoidin Borate.*—Julius Jobst has examined a compound described by Pavesi in "La Farmacia," 1879, No. 26, as a crystallized compound of chinoidin and boracic acid. He found that the yellow, scaly crystals, prepared as directed by Pavesi, when recrystallized several times from water, lost more and more of the chinoidin until finally scales of pure boracic acid only remained, easily recognized by their lustre and greasy feeling. He concludes, therefore, that the crystals examined were crystals of boracic acid, holding traces of chinoidin mechanically enclosed. The existence of a crystalline compound of chinoidin is, as far as the author knows, not as yet established.—*Ibid.*, p. 750.

The Alkaloids of Belladonna, Datura, Hyoscyamus and Duboisia.—Ladenburg, whose work in the preparation of artificial alkaloids has already been quoted (this journal, current vol., pp. 148 and 198), summarizes our knowledge of this class of alkaloids in a short notice:

Atropia Belladonna contains at least two alkaloids, which on account of their different specific gravity, may be designated as heavy and light atropia. The heavy atropia is the alkaloid commonly known under that name, first prepared pure by Meyn and established by Liebig as $C_{17}H_{23}NO_3$ in composition. Its gold-salt is lustreless and fuses at 135°—137°. From its decomposition products the author reformed the alkaloid last year. The light atropia fuses at 107° and yields a gold-salt fusing at 159°, the analysis of which shows its composition to be $C_{17}H_{23}NO_3$,Hcl,Au,Cl_3. This alkaloid is therefore identical with Hyoscyamina.

Datura stramonium contains, also, two alkaloids, which may be designated as heavy and light daturin. In this plant, as contrasted with *belladonna*, the lighter alkaloid predominates. The more difficultly soluble, heavy daturin fuses at 113·5° to 114°, and must be considered as a mixture of atropin and hyoseyamin. It yields a gold salt, fusing between 135° and 150°, out of which by crystallization, repeated six times, and by rejection each time of the mother-liquor, is obtained hyoscyamin gold chloride, fusing at 158° to 160°. From the mother-liquors by evaporation is obtained nearly pure atropin gold chloride, fusing at 135° to 140°. If the heavy daturin be repeatedly crystallized out of dilute alcohol pure atropin can be isolated from it, fusing at 113·5° to 114.5°, and yielding a lustreless gold salt, fusing at 135° to 139°. The light daturin is the alkaloid recently studied by Meyer and myself, and shown to be identical with hyoscyamin.

Hyoscyamus also contains two alkaloids, which may be distinguished for the present as crystalline hyoscyamin and amorphous hyoscyamin. The crystalline hyoscyamin has already (this journal, April, 1880, p. 198) been described. It is especially characterized by its shining gold salt, fusing at 159°, while atropin gold chloride fuses in boiling water. The hyoscyamin itself fuses at 108·5°, while atropin fuses at 113·5° to 114.5°. Its mydriastic action is in general similar to that of atropin, although in certain cases it appears to have a different action, as is shown in the use of duboisin, the identity of which with hyoscyamin the author has shown (*loc. cit.*, p. 198). The amorphous hyoscyamin, which comes into commerce as a brown resin, contains a hitherto unknown alkaloid, with the investigation of which the author is at present engaged. It is characterized by a very beautiful gold chloride salt, which is distinguished from either atropin gold chloride or hyoscyamin gold chloride by its much higher fusing point and its crystalline form.

Duboisia myoporoides apparently contains only the one alkaloid, the identity of which with hyoscyamina has been already (*loc. cit.*, p. 198) referred to.—*Ber. der Chem. Ges.*, xiii, p. 909.

Analytical and Applied Chemistry.—*Rapid and easy Process for simultaneously detecting Nitrogen, Sulphur and Chlorine in Organic Compounds.*—P. Spica gives the following concise method: The substance to be examined is heated with sodium in a test-tube and the product dissolved in water as in the ordinary way of testing for nitrogen by Lassaigne's process; the solution will then contain the nitrogen in the state of cyanide, the sulphur as sulphide, and the chlorine, bromine, or

iodine as chloride, bromide, or iodide if these elements be present. A drop of the alkaline liquid placed upon a clean silver surface will at once produce a black stain if a sulphide has been formed, whilst the cyanogen may be detected by the Prussian blue test in a portion of the liquid. If neither of these is present, the halogen may be at once tested for in another portion of the solution by adding nitric acid and silver nitrate, but if a sulphide or cyanide is present, it must be first destroyed by mixing the solution with about half its bulk of pure sulphuric acid and heating for a short time before adding the silver nitrate.—*Jour. Chem. Soc.*, May, 1880, p. 348, from *Gazzetta*, 9, 574.

The Coloring Matter of Sea-weeds.—Dyers and colorists generally will be interested in a paper by M. Descourt, read at a meeting of the French Academy of Sciences. Attention has been drawn to the violet color of oysters obtained in the basin of Arcachon, which color has been attributed by some observers to the iodine and bromine which the water, it was conjectured, might contain in excessive proportion, owing to their concentration through the absence of rain and the extreme dryness of the months of June, July and August. M. Venot, an oyster cultivator of Arcachon, requested M. Descourt to endeavor to ascertain the real cause of this coloring. After several unsuccessful researches M. Descourt's attention was attracted by a noteworthy circumstance. He had steeped some red algæ in a little of the sea-water with the object of studying them. Before proceeding to analysis, he washed the plants in distilled water in order to clean them from impurities. To his surprise the water took a splendid carmine-purple tint, which was the more astonishing as the sea-water in which the algæ had been immersed for some days had no trace of discoloration. A more complete examination of the algæ and of the colored solution enabled M. Descourt to explain the peculiar color of the oysters. Examined under the microscope, the fronds of the algæ were seen to have a mass of spores of a beautiful carmine color. These communicated no color to the natural sea-water of the basin; but when the latter was sufficiently diluted it took from the spores a splendid rose-color. Treated with alcohol and ether a beautiful green coloring matter similar to chlorophyll was obtained. Treated with distilled or fresh water a magnificent carmine-purple, slightly fluorescent, was produced. M. Descourt therefore concluded that the color of the oysters was due to the presence on the breeding-ground of a large quantity of these small algæ which belong to the beautiful rhodospermæ or Floridæ families, genus

Rytiphlæ purpuræ of Agarth. These algæ, says M. Venot, are very abundant on the Arcachon breeding-grounds and cause considerable loss to the cultivators, as they attach themselves to the valves of the young oysters and often carry these away. The spores furnish the animals with a very abundant, but highly-colored food. The molluscs assimilate the coloring matter, which is preserved, more or less modified, in the lobes of the mantle and the branchial plates when the sea-water is not sufficiently diluted by rain to dissolve the dye. A year or two ago the whole basin of Arcachon was subject to extreme drought, and hence the violet color and peculiar taste of the oysters.—*Jour. App. Sc.*, April, 1880, p. 45.

PHARMACEUICAL NOTES.

By R. F. Fairthorne, Ph.G.

Artificial Congress Water.—So many receipts for making artificial spring waters are constantly published in the pharmaceutical journals that it may, at first sight, appear superfluous to offer another, still most of the formulas for making a representative of Congress Saratoga Water hitherto given are mere imitations of that celebrated water, containing perhaps only two or three of the principal ingredients, and, in some instances, introducing in considerable proportion substances that do not exist in it naturally. I would therefore offer the following, which includes all the constituents of the true water in the proportions in which they are found, according to the analysis of a celebrated chemist; or, more properly speaking, the quantities of each ingredient are such that by double decomposition the proper proportions will be produced, namely:

Bicarbonate of sodium,	314 grains
Precipitated chalk,	85
Calcined magnesia,	24
Nitrate of strontia,	1
Sulphate of manganese,	2
Sulphate of iron,	1
Sulphate of potassium,	1½
Nitric acid,	1
Carbonate of potassium,	18
Chloride of sodium,	44
Bromide of sodium,	2
Iodide of sodium,	3
Alum,	2½
Carbonate of lithia,	8
Solution of silicate soda,	3
Muriatic acid, sufficient quantity.	
Carbonic acid water, "	

As magnesia or the carbonate as well as carbonate of lime are nearly insoluble in carbonic acid water in the state they are found in commerce, it is necessary that they should be freshly precipitated, when they will be readily dissolved by it. This is accomplished by dissolving them in sufficient muriatic acid, thereby forming the chlorides of magnesium and calcium. The 314 grs. of bicarbonate of soda, having been dissolved in 12 fluidounces of water, is added to the solution of the chlorides, when freshly precipitated carbonates are formed. To this mixture is added sufficient carbonic acid water to make a clear solution, which would therefore contain both bicarbonate of magnesia and of lime, and chloride of sodium formed by double decomposition. It will be observed that there are 44 more grains of chloride of sodium called for by the receipt. This completes the quantity of that salt contained in one gallon of the water. The rest of the ingredients, having been dissolved in carbonic acid water, are added, and the whole made up to one gallon with the same menstruum, will produce an artificial congress water that both in taste and effect bears the closest possible resemblance to the natural water.

Many persons have complained of the want of efficacy of artificially made waters, and of their not having the same properties as those which are natural. This, I believe, is due to the fact that the formulas by which such waters are made often differ from the analysis by omitting such ingredients as exist in small proportions. I have never found this objection made against the water as prepared by this formula, which I attribute to the retention of all the ingredients.

Aromatic Sulphuric Acid—A Suggestion Made.—It has often occurred to me that an improvement might be made or a substitute offered for the present formula, so that if necessary aromatic sulphuric acid could be made in a few minutes by using the tincture of ginger and oil of cinnamon instead of the powdered root and bark, thereby saving time and producing a perfectly satisfactory article in a few minutes. It differs somewhat in appearance from the officinal, being lighter in color, and is made in the following manner:

Take of	Sulphuric acid,	6 troyounces
	Tincture of ginger	4 fluidounces
	Oil of true cinnamon,	9 drops
	Alcohol,	1 pint and 12 fl. ozs.

Add the acid gradually to a pint of alcohol; when cool mix this with the mixture of tincture of ginger and remainder of the oil of cinnamon has previously been dissolved.

Wine of Tar.—As usually made, wine of tar is an unsightly, unstable and unpalatable article, but as prepared by the following receipt will be found free from these objections:

Take of	Tar,	4 troyounces
	Granulated sugar,	5 troyounces
	California sherry,	1½ pints
	Water, sufficient quantity to make	2 pints
	Sand, washed and dried,	8 ounces

Rub the tar with the sugar and sand in a mortar, then with the wine and water. Pour into a bottle all the ingredients and agitate occasionally for 4 or 5 days. Filter with paper pulp, when a fine clear wine will result, highly impregnated with the tar, which will keep without undergoing acetous fermentation. By employing the California wine and water a preparation results that does not contain much more alcohol than would be the case if made by the ordinary plan. The employment of sand is on account of the mechanical division it effects.

How to Disguise a dose of Castor Oil.—It frequently happens that the druggist is asked to mix a dose of castor oil for a customer who is not able to come to the store, and as the common custom for disguising it is to mix it with soda water and sarsaprilla syrup, it not unfrequently happens that before the dose thus mixed reaches the unfortunate individual for whom it was ordered nearly all the froth (on which the disguising effect of the mixture depends) has disappeared, and a nauseous "floating island" of oil meets the lips of the patient, disgusting still more his already nauseated stomach. Now, in order to obviate such a difficulty, I have found the following simple device to answer. The oil is poured on the top of the following mixture, namely:

Syrup of orange peel,	f℥i
Syrup of gum arabic,	f℥ss
Caramel,	f℥i
Tartaric acid,	xxv grains
Water,	f℥iv

M.

Having dissolved the acid in the water add the syrups and caramel and stir them up; then pour the oil on the top of this mixture. Wrap up 30 grains of bicarbonate of soda in a paper, which can be marked effervescing powder. When the patient is to take the dose the soda powder is added and well stirred, producing a thick froth which completely envelops the oil.

Mr. T. S. Wiegand states that he has found that by adding half a fluidrachm of the tincture of hops to the dose of oil as commonly mixed, namely, with soda water and sarsaparilla, that the froth of the mixture will remain for a considerable length of time, long enough in most instances to meet the requirements of the case.

GLEANINGS FROM THE GERMAN JOURNALS.

By Louis von Cotzhausen, Ph.G.

Detection of Fuchsin in Wine.—A contributor to the "Pharm. Centralanz." adds ammonia in excess to the wine, and then shakes with amylic alcohol, when the fuchsin, if present, colors the alcohol. E. Geissler tested this simple method (for another simple method see "Amer. Journ Pharm.," May, 1876, p. 236) and found it excellent, although he does not comprehend how the fuchsin, after being transformed by the ammonia into colorless rosanilin, can color the alcohol. He also calls attention to the following fact, a knowledge of which may serve to avoid misunderstandings, namely: that fuchsin does not color wines permanently, but precipitates soon with the tannic acid and other combinations; the fuchsin even disappears from the precipitate soon by decomposing; this explains why fuchsin is sometimes proved to be present in wines when first examined and cannot be traced in it after standing for several years. Geissler therefore deems it prudent to test suspected wine for fuchsin without delay, and if the latter is found, to keep it and a sample of the wine as a proof of the adulteration.—*Pharm. Centralh.*, Feb. 12, 1880, p. 55.

For Nightsweats of Patients suffering with Lung-phthysis, Dr. Kuehnhorn administered internally successively quinia, atropia, (the latter was also injected hypodermically), digitalis, boletus laricis, etc., and used externally cold lotions and a wash consisting of alcohol and tannin, with either *no*, or at least only *temporary* success. At last he prescribed with astonishing success a dusting-powder consisting of 3 parts salicylic acid, 10 parts starch and 87 parts Venetian talc, which was dusted all over the body, the skin of the latter if too dry, being first rubbed with alcohol and tannin so as to make the powder adhere. In order to prevent the irritation and coughing usually brought about by the dust of the acid it is necessary for the patient to press a cloth on mouth and nose during the dusting. The use of the powder prevented nightsweats in every case without causing any other inconvenience.—*Pharm. Centralh.*, February 26, 1880, p. 74, from *Berl. Klin. Wochenschr.*

Seidlitz Chanteaud, an alledged dehydrated, effervescent and refreshing laxative, is one of the so-called elegant remedies, appears in the market in the shape of snow-white granules, and consists of a mixture of dry epsom salt, sugar and Seidlitz powder mixture (a mixture of rochelle salt, bicarbonate of soda and tartaric acid).—*Pharm. Centralh.*, February 26, 1880, p. 75.

A Curious Nostrum, advertised as "Corn-Magnet," and recommended for removing corns in five minutes, without pain, was analyzed and found to consist of sulphur pencils, colored dark with graphite and encased in tin. The alleged painless treatment consists in igniting one of these pencils and dropping one drop of the burning sulphur on the corn.—*Pharm. Ztg.*, February 14, 1880, p. 93.

Saint Barthelémy's Fever Liniment is made by Dr. Sézeric by the following;

℞	Olei terebinthinæ,	125·0
	Tincturæ opii,	5·0
	Camphoræ,	3·0
	Olei olivæ	60·0

M. S. Apply for 6 minutes every 6 hours to the whole spine. After applying 3. to 4 times the intermittent fever stays away.

—*Pharm. Centralb.*, February 26, 1880, p. 72.

VARIETIES.

Mora's Hair Tonic consists of a mixture of castor oil, 22 parts; tincture bals. peruv., 22 parts, and alcohol, 360 parts.—*Pharm. Ztg.*, Feb. 25, 1880, p. 118.

A Brilliant Gloss can be imparted to pectoral troches by painting them with a thin, hot gelatin solution, darkened with a little solution of licorice.—*Ibid.*

Retinol, a patent lubricating oil, was analyzed, and proved to consist either of a not strictly pure retinol, which was obtained in a pure state by distilling pine resin, as a clear, oily, smooth tasteless and odorless liquid, not altered by light, and having the specific gravity 0·90 by Pelletier and Walter; or of an analogous product of the dry distillation either of resin, of bituminous slate, or of charcoal. It is, undoubtedly, an excellent lubricating oil, since it is not altered by age, does not thicken, and does not turn rancid.—*Pharm. Handelsbl.*, Feb. 25, 1880, p. 8, from *Bayr. Ind. u. Gewerbebl.*

Formulæ for Chilblains.—℞ Sulphuric acid, ℥i; spirit of turpentine, ℥i; olive oil, ℥iii. Mix the oil and turpentine first, then gradually add the acid. To be rubbed on two or three times a day.

II. Lard, ℥iv; turpentine, ℥i; camphor, ℥ii; oil of rosemary, ♏xv. Rub in with continued friction.

III. Yellow wax, ℥iii; olive oil, ℥iii; camphorated oil, ℥iii; Goulard extract, ℥iss. Melt the wax with the oil, then add the camphorated oil and Goulard extract.

The first two are for the unbroken, and the last for the broken chilblains.

IV. Beef's gall, ℥iv; ol. terebinth., ℥iv; spts. vini rect., 90 per cent., ℥iss; tinct. opii ℥i. Mix. Dr. Val. Mott.

V. Another formula for the same affection is beef brine, Oi; potassii nitratis, ʒii; aquæ ammoniæ, ℥ii. Mix.—*Toledo Med. and Surg. Jour.*, February.

Salicylic Acid is detected in dark-colored fruit juices and wines by shaking well 50 cc. wine with 5 cc. amylic alcohol for a few minutes, decanting the alcohol, which collects on the surface after standing, into a test-tube, mixing with an equal bulk of spirits of wine, in which it dissolves, and adding a few drops of iron chloride, when salicylic acid, if present, produces immediately a dark violet coloration. Tannic acid, being scarcely soluble in amylic alcohol, will not prevent the reaction. —*Pharm. Centralh.*, Jan. 8, 1880, p. 16, from *Ztschr. f. Analyt. Chem.*

A Durable Black Stain for Wood, which is not destroyed by light, moisture or even by chloride of lime, is made by Dr. R. Godeffroy by first applying with a brush or sponge to the wood a solution of anilin muriate in water, to which a little copper chloride was added, and then after drying a solution of red potassium chromate in water.—*Ztschr. d. Allg. Oest. Apoth. Ver.*, Feb. 1, 1880, p. 55.

What is Butterpowder?—Hager invariably dispenses acid tartrate of potassium as butterpowder (10·0 for every 10·liters cream), claiming that by its use butter is made better and in greater quantity. The addition of 1 to 2 teaspoonfuls of cream of tartar to sweet cream will always bring the butter inside of an hour, even in the coldest weather, when churning is often exceedingly slow and almost seems impossible unless the cream is moderately sour. Other authors think that sodium bicarbonate is a better butterpowder, which is contradicted by Hager, who feels convinced that its use requires at least 2 to 3 times as much time, and that it yields at least 10 per cent. less butter.—*Pharm. Centralh.*, February 5, 1880, p. 50.

For Removing Nitrate of Silver Stains, Dr H. Krætzer recommends instead of potassium cyanide a solution of 10 parts sal ammoniac and 10 parts corrosive sublimate in 100 parts water, with which liquid the stains are said to be removed readily from the hands, linen, wool and cotton without injuring the fabric.—*Archiv d. Pharm.*, January, 1880, p. 52, from *Koller's neueste Erfind. u. Erfahr.*

If two parts Dry Silver Oxide are triturated in a porcelain mortar, or even when rubbed on writing-paper by means of a spatula with 1 part antimonium sulphide or amorphous phosphorus, the mixture will ignite very readily according to Prof. Bœttger. Dry silver oxide will also ignite almost immediately when moistened with a single drop of phenol or creasote, prepared from beech wood tar or of commercial oil of cloves, a partial reduction of the silver oxide to metallic silver taking place.—*Archiv d. Pharm.*, January, 1880, p. 53, from *Polyt. Notizbl.*

Pharao's Serpents.—A new mass for this chemical toy is made by mixing together 2 parts potassium bichromate, 1 part saltpetre and 3 parts sugar, all in a dry, fine powder, and making into a mass with sufficient balsam Peru.—*Pharm. Centralh.*, February 5, 1880, p. 52, from *Polyt. Notizbl.*

The cause of large blackish-gray stains formed on silver spoons when immersed in beef soup, which was subsequently eaten with impunity, was investigated by Torquato Gigli, whose investigations prove that:

1. Powdered sulphur dissolves in the fat of meat without imparting to the soup a peculiar taste or odor, unless the quantity of sulphur is large.

2. In this condition of solution, and at a temperature very near that of boiling water, the sulphur readily combines with silver, forming black silver sulphide. In this particular case the stains on the silver spoons consisted of black silver sulphide, and were caused by powdered sulphur which, through carelessness or otherwise, had fallen into the kettle, or had in some manner been mixed with the meat used in the preparation of the soup.—*Schw. Wochenschr.*, Feb. 20, 1880, p. 59, from *Orosi*, August, 1879.

So-called "Fluid Meat," an English nostrum recently introduced into the German market, is said to contain all the nutritive constituents of meat without the fat in a liquid form, to be very nutritive for this reason without requiring digestion, and is therefore particularly recommended in all cases in which the stomach is supposed, on account of want of gastric juice, no longer to be able to transform the albuminous substances into soluble combinations. Two tablespoonfuls of it are said to contain the nutritive constituents of 625 grams of meat. M. Rubner's analysis proved, however, that it would be necessary for a patient to consume 336 grams "fluid meat" daily in order to get 80 grams albumen or pepton, which would make it altogether too expensive, and therefore objectionable as nutriment.—*Phar. Centralh.*, Feb. 19, 1880, p. 67, from *Dingl. Journ.*, from *Ztschr. f. Biologie*, 1879.

Influence of Vichy Water on Digestion.—M. Leven read before the Société de Biologie of Paris an account of certain experiments which he had recently made in conjunction with M. Sémerie in regard to the action of Vichy Water upon the digestion. The first effect of the injection of Vichy Water was found to be a very marked congestion of the liver. In an animal which had drunk 300 grams of the water the weight of the liver was found, after a short time, to have increased by 80 grams. Experiments were also made to determine whether Vichy Water aids the digestion of foods. A dog was fed upon 200 grams of cooked beef and 150 grams of pure water, and was killed at the end of three hours, when all the food was found in the stomach. A second dog was then fed with the same quantity of meat, but the fluid was replaced by 150 grams of Vichy Water, and it was found that at the expiration of three hours 76 grams of the food had disappeared from the stomach. Experiments upon the digestion of bread gave analogous results. Thus, the stomach of a dog who had eaten 200 grams of bread contained three-fourths of the whole quantity at the end of five hours, while a dog who had eaten 200 grams of bread, and had drunk 150 grams of Vichy Water, had almost finished its gastric digestion in five hours, since only 50 grams remained.—*Le Progrés Médical.*

Araroba ; Goa Powder.—According to Holmes ("La Presse Médicale Belge") he araroba comes from a plant of the family *Cæsalpinaceæ*; according to Aguilar, on, the other hand, the plant is a Leguminous of the genus *Andira*, having considerable analogy to *Andira inermis*, which furnishes the bark formerly employed as a vermifuge. This not yet having been studied, Aguilar gives it the name *Andira araroba*. The *Andira araroba* is met with wild in the southern part of the province of Bahia. The araroba powder must be the product of oxidation of a resin existing in large quantities in the wood of the tree. Insects boring holes in the wood favor the entrance of air and the consequent oxidation of the resin.—*Med. Press and Circular*, from *Cincinnati Lancet and Clinic*, May 22, 1880.

Remedies for Sea Sickness.—Cory, lately surgeon on a passenger steamer, recommends in *mal de mer* a combination of small doses of bromide of potassium and hydrate of chloral taken with the citrate of magnesium during effervescence. Spirits of sulphuric ether may be added when there is much depression.—*Lancet*, March 20, 1880, from *St. Louis Courier of Med.*, May, 1880.

MINUTES OF THE COLLEGE.

PHILADELPHIA, June 28th, 1880.

A stated meeting of the Philadelphia College of Pharmacy was held this day at the Hall, No. 145 North Tenth street. Dillwyn Parrish, President, in the chair; thirteen members present.

The minutes of the last stated meeting were read, and, on motion, approved.

The minutes of the Board of Trustees for April, May and June were read by Thomas S. Wiegand, and, on motion, adopted.

These minutes make mention of the appointment of a committee of the Board in May to purchase the houses in the rear of the College adjoining, on Elwyn street, which committee reported at the meeting of the Board in June that they had succeeded in obtaining the property within the limit authorized by the Board.

These minutes further contain the following communication:

"PHILADELPHIA, April 6th, 1880.

"With a view of stimulating the use of the microscope in Pharmacy and the more thorough investigation of vegetable drugs of American origin, the undersigned respectfully submits to the Board of Trustees, for approval and for publication in the forthcoming announcement, the offer of a prize, at the expense of the undersigned, to the class of 1880-81, said prize to consist of a Zentmayer microscope, American histological stand, with rack and pinion, two eye-pieces and two objectives, in walnut case, and to be awarded

1st. "For the best meritorious thesis describing the structure of two or more closely related American Drugs of vegetable origin, and accompanied by original drawings and by specimens; or,

2d. "For the best meritorious thesis describing the structure and the proximate constituents of an American drug of vegetable origin, and accompanied by specimens and original drawings; or, if no thesis should be deemed of sufficient merit,

3d. "For the best and most satisfactory description of the histology of vegetable drugs at the annual examination in March, 1881.

"Very respectfully, JOHN M. MAISCH."

The following gentlemen were elected delegates to represent this College at the annual meeting of the American Pharmaceutical Association, which will be held at Saratoga, on the second Tuesday in September next, viz.: Messrs. Alonzo Robbins, Samuel S. Bunting, Charles W. Hancock, Dr. Roger Keys and Charles A. Heinitsh.

And to attend as delegates to the convention of Teaching Colleges, Messrs. Charles Bullock, Prof. John M. Maisch and Prof. Jos. P. Remington.

There being no further business, then, on motion, adjourned.

WILLIAM J. JENKS, *Secretary*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Massachusetts College of Pharmacy.—At a meeting of the Massachusetts College of Pharmacy held June 3d, 1880, the following were elected delegates to the Convention of Teaching Colleges, to be held at Saratoga in September: Professor G. F. H. Markoe, Ph.G.; S. A. D. Sheppard, Ph.G.; C. A. Tufts, M.D., Ph.G.

The following gentlemen were elected delegates to the Twenty-eighth Meeting of the American Pharmaceutical Association at Saratoga: Prof. G. F. H. Markoe, Ph.G.; Edw. S. Kelley, Ph.G.; S. A. D. Sheppard, Ph.G.; T. Doliber, Ph.G.; Prof. E. L. Patch, Ph.G., and as alternates, C. I. Eaton, D. G. Wilkins, Geo. F. Dinsmore, B. F. Stacy, and T. L. Jenks, M.D.

The New York State Pharmaceutical Association met on the 19th of May at Syracuse, and was called to order by Prof. P. W. Bradford, of New York. They were welcomed by Mayor Hendricks as visitors and by Dr. H. D. Didama on behalf of the medical profession. The meeting was a great success, 130 new members having been elected. The following gentlemen were elected officers for the ensuing year: President, Prof. P. W. Bedford, New York; 1st Vice President, G. M. Baker, Brooklyn; 2d Vice President, Frank Hamilton, Syracuse; 3d Vice President, H. B. Napier, Oswego; Secretary, Clay W. Holmes, Elmira; Treasurer, Wm. Blaikie, Utica.

The Committee on Legislation reported the draft of a law regulating pharmacy in the State, which, after discussion and a few amendments, was unanimously adopted.

The pharmacists of Syracuse entertained their visitors most kindly, and all seemed to be gratified with their visit. The next meeting will take place in Buffalo.

Pittsburgh College of Pharmacy.—The Board of Trustees of the Pittsburgh College of Pharmacy held a special meeting, and elected the following faculty for the ensuing term: S. Henry Stevens, Professor of Pharmacy; George W. Allyn, M.D., Professor of Materia Medica and Botany; Hugo Blane, Ph.D., Professor of Chemistry. The approaching term begins October 1st, and the prospects are very flattering for a large class in each department.

Pennsylvania Pharmaceutical Association.—The third annual meeting of this Association was held in Sænger Hall, Allentown, on Tuesday and Wednesday, June 8th and 9th, 1880. About sixty members were present. President C. A. Heinitsh called the Association promptly to order at 3 o'clock P.M., June 8th. Dr. E. G. Martin, Mayor of Allentown, in a neat speech welcomed the Association to the city. The president, after returning the thanks of the Association, proceeded to deliver his annual address. At the conclusion of this address it was, on motion, referred to a committee of three to report upon the suggestions contained in it.

Messrs. Randal Rickey and Arthur G. Smith, delegates from the New Jersey Pharmaceutical Association, presented their credentials, and the president invited them to seats on the floor and to participate in the deliberations of the meeting.

The remainder of the afternoon was occupied in electing members, and in listening to the reports of the officers and the special committees appointed a year ago. The Secretary reported the publication of 500 copies of the Proceedings of last year, 200 of which still remain on hand. The treasurer reported a balance of $465.09 in the treasury. The Executive Committee reported the admission of 9 members since the last annual meeting, making the total number 146. Subsequently this committee reported 51 applicants for membership, all of whom were elected by ballot.

Reports were also read from the Committee on Legislation and Trade Interests, and the Committee on Adulterations and Sophistications, and the chairman of the Committee on Queries reported 16 queries to be answered at the next annual meeting. The report of the Delegates to the American Pharmaceutical Association was read by Mr. Samuel Gerhard, of Philadelphia.

The president appointed Messrs. Alonzo Robbins, J. W. Landis and Wm. Turner a committee to report upon the articles placed on exhibition.

Mr. G. W. Kennedy offered the following resolution: Resolved, that a committee of five be appointed for the purpose of drafting a bill regulating the practice of pharmacy, sale of poisons and preventing the adulteration of food, to be presented to the next Legislature. The president, upon the adoption of this resolution, appointed the following committee: Messrs. G. W. Kennedy, John M. Maisch, John T. Patton, J. H. Boher and Wm. Harris. A communication from Smith, Kline & Co, of Philadelphia, inviting the Association to participate in an excursion over the Switchback Railroad was read by the secretary, and on motion of Mr. Landis the invitation was accepted with the thanks of the Association.

A communication signed by Messrs. Turner & Wiegand, a committee of the Trade Association of Philadelphia druggists, requesting this Association to act in conjunction with their organization to induce our representatives in Congress to use their influence in relieving the trade from the unjust tax and odium cast upon us as liquor dealers.

The second session on Wednesday morning was called to order by the president at 9 A. M. The credentials of Mr. Clay W. Holmes, a delegate from the New York State Pharmaceutical Association, were read, and he was invited to a seat and to participate in the deliberations of the meeting.

The Committee on the President's Address approved of the following recommen-

dations: 1st. To pay the secretary $50 per annum. The salary of the treasurer, on motion of Prof. Remington, was also made the same. 2d. To elect delegates to the New York and New Jersey Pharmaceutical Associations. 3d. To appoint a committee to draft a bill on the regulation of pharmacy to be presented to the Legislature. 4th. To appoint a committee to prepare a code of ethics for the Association, and a committee on local and private formulæ. 5th. To appoint a committee to prepare an article relating to apprentices in the drug business. 6th. To pass a resolution endorsing the action of the Western Druggists' Association in the repeal of the stamp tax on proprietary medicines and perfumery, and send a copy of the same to the Commissioner of Internal Revenue and the proper committee of the Senate and the House of Representatives.

The following officers were elected for the ensuing year: Geo. W. Kennedy, of Pottsville, President; George A. Kelly, of Pittsburgh, 1st Vice President; Alonzo Robbins, of Philadelphia, 2d Vice President; Joseph L. Lemberger, of Lebanon, Treasurer; Jacob A. Miller, of Harrisburg, Secretary; James A. Meyers, W. F. Horn and Jacob H. Stein, Executive Committee. Prof. Remington, from the committee on certificate of membership, reported that seventy certificates had been issued during the past year.

A communication from the druggists of Allentown, inviting the members and their friends to partake of a banquet at the Allen House on Wednesday evening at 9 A. M. was received with thanks.

Prof. Remington offered the following resolution, which was adopted:

WHEREAS, The custom of providing entertainments of various kinds for the members of the Pharmaceutical Association is one which greatly impairs the usefulness of such association by consuming valuable time, interfering with the regulur business and imposing upon the local committees such an amount of responsibility, trouble and expense, which dignified scientific bodies should refuse to exact; it is therefore

Resolved, That the Pennsylvania Pharmaceutical Association record their disapprobation of such entertainments, and instruct the association hereafter to decline to make arrangements for the purpose.

Mr. Turner read the report of the Committee on the Exhibition of Drugs, etc. Articles were there from eight different houses. The committee regret there was no creditable display of home-made chemicals and pharmaceutical preparations.

Mr. Cressler, chairman of the committee on the time and place for holding the next meeting, reported in favor of Williamsport, and the 2d of June, 1881. The report was accepted, and Mr. Edw. A. Cornell, of Williamsport, was elected Assistant Secretary.

Prof. Remington moved that a committee of five from the Philadelphia Trade Association be invited to co-operate with a similar committee from the Pennsylvania Pharmaceutical Association, which was adopted.

President Kennedy read a paper in answer to the following query:

Phosphate of sodium is said to be adulterated with carbonate and sulphate of sodium. Is this correct? A qualitative analysis of the article is desirable.

Prof. Remington read Louis Emanuel's paper in answer to the following query:

What addition to epsom salts will diminish its bitter and nauseous taste without materially altering its properties?

The Association adjourned at 12 M. to meet at 2 P. M.

THIRD SESSION. The Association met at 2. P. M. to listen to the lecture of Prof. Remington on the metric system. At the close of this address, 3 P. M., the president called the Association to order and announced the following committees: Committee on Trade Interests and Legislation—Dr. Geo. Ross, Wm. Harris, Jay H. Boher, W. D. E. Hayes, Wm. L. Turner, Dr. H. B. Parry, John A. Weaver, John P. Thompson, J. W. Landis and Thomas Deibert. Committee on Adulterations and Sophistications—Geo. A. Kelly, Alonzo Robbins and C. H. Cressler. Committee on Papers and Queries—Samuel Campbell, W. F. Horn and James B. Cherry. Committee on Ethics and Local and Private Formulæ—Charles T. George, John B. Raser, Herman Rabenan, Samuel Campbell and C. C. Hagenbuch. Committee on Apprentices relating to the drug business—P. M. Ziegler, Dr. Wm. H. Egle and Jos. P. Remington. Delegates to the American Pharmaceutical Association—L. H. Harris, Jacob H. Stein, C. L. Lochman, J. A. Meyers and Charles C. Klump. Delegates to the New Jersey Pharmaceutical Association—P. S. Brugh and Robert Walch. Delegates to the New York State Pharmaceutical Association—Charles A. Heinitsh and V. E. Shaw.

A vote of thanks was given Prof. Remington for his valuable and interesting lecture.

An hour was occupied in general interchange of views among the members regarding the merits and the best mode of manufacturing certain pharmaceutical preparations.

Mr. Charles T. George was asked to prepare a paper on the relative value of the various extracts of meat in the market, which he promised to have ready for the next annual meeting.

Prof. Remington offered the following:

Resolved, That the chairman on papers and queries be requested to secure from members as many promises to answer queries as possible at the time of the meetings.

Dr. Purcell offered the following amendment to the By-laws, Art. 1, ch. 2d.: After the words "professional standing" shall be inserted "of not less than twenty-one years of age and three consecutive years of practical experience," which was laid over till next meeting.

Mr. Lemberger offered a resolution that the secretary be authorized to send a Copy of the Proceedings to the president, secretary and chairman of the Executive Committee of each State Pharmaceutical Association, which was adopted.

Mr. George presented a copy of the report on the revision of the Pharmacopœia, which was prepared by the committee appointed by the Association last year and handed in to the Decennial Convention which met at Washington on the first Wednesday of May. The report was received and ordered to be printed with the proceedings.

There being no further business, after the adoption of a few resolutions of thanks to the assistant secretary, Mr. C. C. Klump, the druggists of Allentown, the citizens and the press, the Association adjourned to meet in Williamsport the second Tuesday in June, 1881. In the evening the members were handsomely entertained at the Allen House, and on the following morning forty-seven members and ladies, under the escort of Mr. M. N. Kline, took a ride over the Switchback.

Ohio State Pharmaceutical Convention.—The second annual convention of this Association was held in Dayton on the 19th ult., in the Association Hall, Dr. J. F. Judge, of Cincinnati, the President, being in the chair. From the report, as published in one of the papers, the meeting was eminently successful, 145 members having been elected at the first session.

A number of papers upon subjects of interest to the profession were read, and referred to the Committee on Publication, and some ten subjects were allotted to members for investigation, to report at the next annual meeting, which is to take place in Toledo on the third Wednesday in May, 1881. The following list of officers for the ensuing year was elected at the evening session: President, J. W. Dietrich, of Dayton; 1st Vice President, J. F. Judge, Cincinnati; 2d Vice President, H. C. Gaylor, Cleveland; Treasurer, Chas. Huston, Columbus.

Kentucky Pharmaceutical Association.—The third annual meeting of the Kentucky Pharmaceutical Association met in Owensboro' May 18th. The roll-call showed members were present from various portions of the State.

President Vincent Davis, of Louisville, delivered an address, showing that pharmacy is on the advance in this State.

The names of eight pharmacists were then presented by the Executive Committee and duly elected members of the body.

Out of eleven queries by the Committee on Notes and Queries eight were responded to. These will appear in the published Proceedings.

After the election of the following officers the Association adjourned, to meet in Louisville in May, 1881: M. H. Webb, President, Simpsonville; S. H. Ford, 1st Vice President, Owensboro'; Geo. H. Cary, 2d Vice President, Louisville; Henry McGill, 3d Vice President, Owensboro'; W. G. White, Recording Secretary, Richmond; C. S. Porter, Corresponding Secretary, Eminence; Peter Nodler, Treasurer, Covington.

The Pharmaceutical Society of New Zealand held meetings on the 4th of February and 2d of March, at which they determined to commence a library for the benefit of the members; to secure a stated place of meeting in Wellington; to urge the passage of a pharmacy act, and amend their charter in some particulars. The spirit that is thus shown speaks well for the interests of pharmacy in the future in New Zealand.

EDITORIAL DEPARTMENT.

State Pharmaceutical Societies.—Since our last issue four State Pharmaceutical Associations have held their annual reunions, and the interest shown in many of them augurs well for the cause of pharmacy. To have attempted the formation of such associations a few years ago would have been thought entirely unnecessary; and now there is scarcely a State where such a society is not either in progress of formation or being urgently called for by many of the craft.

The advantage that can and ought to accrue from these various State societies are many, but their realization will depend largely upon the wisdom and devotion of those who are the active workers in them. A few subjects that ought to claim their attention are the enactment of laws for the regulation of pharmacy where none such exist, and the amendment of those now in force where they are inadequate to the public or oppressive to those engaged in the practice of pharmacy. The co-operation of these various societies ought to be secured in an endeavor to modify the laws and rulings of the general government where they oppress the true liberty of those engaged in our business. This is, in fact, a duty which a body of men, possessed of proper self-respect, should require of the respective representatives in Congress. We have the right to claim the same respectful consideration and attention that any other class, equally respectable in education and general usefulness to the public, have almost always had accorded to them.

The reports of the various societies are noticed in this department of our Journal, and we would earnestly urge all our readers to use their best endeavors to increase the success and usefulness of these organizations.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Practitioners' Reference Book. By R. J. Dunglison, M.D.

That a second edition of a work of this kind and size should be demanded in three years is proof of considerable merit. It will be seen by a glance at a few of the subjects treated of that are mentioned below, how useful a volume it is, viz., weights and measures of the U. S. P.; the weights and measures of the metrical system; the relation these sustain to each other; the approximation of ordinary measures to metrical, metrical measures to fluidrachms.

Solubilities of medicines in the most used menstrua, abbreviations in common use among medical writers, and tables of specific gravity, posological tables, baths and their medication.

Incompatibles, with hints as to the best forms for different remedies to be prescribed in; tables of diagnostic signs of many diseases; rules for examination of urine; poisons and their treatment; directions for restoring persons apparently drowned; the hypodermic use of remedies; dietetic rules; and directions for conducting the last office of a physician on his patient, that of a post mortem. The above partial list will indicate how much that is valuable to physicians and pharmacists, and some that can be learned only by a great deal of reference, is contained in the treatise. The work is published by Lindsay & Blakiston in a style that is worthy of the reputation of the house.

Water Analysis for Sanitary Purposes. By E. Franklantl, Ph.D., F.R.S. Presley Blakiston, 1012 Walnut street. 12mo, pp. 149. Price $1.00

The well known experience of Dr. Frankland is a guarantee of the value of this treatise upon a subject that demands far more attention than it has received; that

everything which is in *daily* consumption should be free from noxious properties is too evident to admit of discussion, and the processes necessary to determine the suitability of water for potable use are so clearly explained that the decision is now no longer a matter of doubt if any intelligent person accustomed but slightly to qualitative analysis attends to the subject.

OBITUARY.

JOHN WILLIAM NEERGAARD died on the 25th of May, in New York, at the age of a little over 70 years, being one of the oldest and longest established apothecaries in that city.

Born on the 23d of April, 1810, at Copenhagen, Denmark, he became apprenticed to an apothecary in Bogeuse, passed the examination as assistant in 1828, and as apothecary in 1831. After having served as a clerk in Denmark and in Schleswig, then a Danish province, he established himself in business in Kjerte minde, on the Island of Fuehnen, in 1837; two years later he disposed of his business, and, in 1840, emigrated to New York, where he soon after his arrival opened a drug store in Pearl street, and kept it for fifteen years; during this time he attended lectures and graduated at the College of Physicians and Surgeons. In 1855 Dr. Neergaard went into partnership with his friend, Mr. John W. Shedden, at the corner of Bowery and Fourth street, New York city; three years later they opened a new store on the corner of Broadway and Twenty-eighth streets, which soon afterwards, by mutual agreement, was owned and conducted, to the end of his life, by Dr. Neergaard, and where for more than a quarter of a century he enjoyed the confidence and respect of the community.

Dr. Neergarrd was a worthy representative man of his profession, and of that more and more disappearing generation of pharmacists who embraced pharmacy when it stood highest among the applied physical sciences and arts; the well-directed home and school education, the long and strict apprenticeship in the store and in the well appointed laboratory, with its rigorous but thoroughly instructive and fascinating application and patient methods, was the true and sole foundation of and highroad to his future proficiency and attainments. The high aims and principles, studious and persistent habits, the keen sense of duty contracted there, shaped for life his character and impressed upon it that sterling solidity and uncompromising integrity for which Dr. Neergaard was justly appreciated and respected.

A man of genial and retiring disposition, and of true modesty, he was strict in the performance of his duties, in the maintenance and elevation of the status and dignity of his profession, sincere in purpose and actions, and amiable to those whom he honored with his friendship. He scorned sophistry, ostentation and vanity, was an observer more than a talker, a man of large knowledge and ripe experience, which he well and usefully applied in his daily work during a long and active career; yet he never aspired to literary fame or public honors.

Dr. Neergaard joined the American Pharmaceutical Association in 1859, and was a member and honorary member of several pharmaceutical colleges and societies.

F. H.